

ERPA 2014

Is asking same question in different ways has any impact on student achievement?

Albena Gayef^{a*}, Can Oner^b, Berrin Telatar^b

^aIstanbul Bilim University School of Medicine Department of Medical Education and Informatics, 34394 / İstanbul, Turkey

^bIstanbul Bilim University School of Medicine Department of Family Medicine, 34394 / İstanbul, Turkey

Abstract

Objective: Multiple-choice and essay exam types are used for assessment of knowledge. The aim of this study was to determine the impact of exam types on student achievement. Method: In this study Istanbul Bilim University School of Medicine 1st year students' (n=66) midterm and final exam results of one course was used. Multiple choice questions were used in midterm exam and essay in final exam. Same four questions were asked as multiple choice in midterm exam while open ended in final exam. Students were divided into two groups. One of two groups constitutes from students answered questions correct in midterm exam and false in final exam. The second group composed of other students. The difference between midterm exam and final exam grade was calculated. Data were analyzed with chi square tests. Significance level was accepted as $p < 0.05$. Results: When assessed for each question separately, large proportion of students whose final exam grades reduced more than 40% was answered the same questions correct in the midterm but false in final exam (for each questions $p = 0,000$; $p = 0,023$; $p = 0,742$, $p = 0,000$ respectively). Conclusion: Achievement of students in same questions differed according to exam type. Learning strategies may have an effect in achievement differences. Further research is planned in order to determine relationship between students' learning strategies, assessment methods and student achievement.

© 2014 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY-NC-ND license

(<http://creativecommons.org/licenses/by-nc-nd/3.0/>).

Peer-review under responsibility of the Organizing Committee of the ERPA Congress 2014.

Keywords: student; achievement; multiple choice; essay; assessment

1. Introduction

Assessment of learning is often one of the more difficult and time-consuming aspects of education. Course grades are a form of summative assessment, usually as a result of performance on examinations. Instructors have a variety

* Corresponding author. Tel.: +90 (212) 213 64 86; fax: +90 (212) 272 34 61.

E-mail address: albena.gayef@istanbulbilim.edu.tr

of examination formats to use for student assessment, each with unique characteristics (Dagogo, Lauriann, & Robert, 2010). Multiple choice questions are the most versatile and widely used exam in education (Schuwirth & Van der Vleuten, 2004).

Multiple choice exams continue to have a useful role in evaluation. Multiple choice questions are expressly designed to assess knowledge. The one major advantage of the multiple choice questions is that it can sample broad domains of knowledge efficiently and hence reliably (Norman, 1995). Two other desirable characteristics of the multiple choice question are worthy of mention. First, it is relatively free from response sets. That is, students generally do not favor a particular alternative when they do not know the answer. Second, using a number of plausible alternatives makes the results amenable to diagnosis. It is easier to construct high quality test items in multiple choice form than in any of the other forms. Despite its superiority, the multiple choice item, does have limitations. First, as with all other paper and pencil tests, it is limited to learning outcomes at the verbal level. In short, the multiple choice item, like other paper and pencil tests, measures whether the student knows or understands what to do when confronted with a problem situation, but it can not determine how the student actually will perform in that situation. Second, the multiple choice item requires selection of the correct answer, and therefore it is not well adapted to measuring some problem solving skills or to measuring the ability to organize and present ideas. Third, the multiple choice item has a disadvantage not shared by the other item types: the difficulty of finding a sufficient number of incorrect but plausible distracters (Linn & Gronlund, 1995).

Some important learning outcomes may best be measured by the use of essay questions. Essay questions provide the freedom of response that is needed to adequately assess students' ability to formulate problems; organize, integrate, evaluate ideas, information and apply knowledge and skills. A major advantage of the essay question is that it measures complex learning outcomes. A second advantage of essay questions is its emphasis on the integration and application of thinking and problem solving skills. The other advantages of essay questions are they enable direct evaluation of writing skills and its ease of construction. The most commonly cited limitation of the essay question is the limited sampling of content they provide. Essay questions especially inefficient for measuring knowledge of factual information (Linn & Gronlund, 1995).

In literature, there are studies compare the achievement of students in a course when assessed by multiple choice questions and essay questions, it was determined differences of students' achievement in courses related with exam types (Oyebola et al., 2000; Dagogo, Lauriann, & Robert, 2010).

The aim of this study was to determine the students' achievement differences in "Principles of Medicine" course according to the exam type.

2. Method

In this study the data of Istanbul Bilim University School of Medicine 1st year students' (n=66) midterm and final exam results of "Principles of Medicine" course was used. The course had given by the same instructor. Multiple choice questions were used in midterm exam and essay in final exam. Same four questions were asked as multiple choice in midterm exam while open ended in final exam. Students were divided into two groups. One of two groups constitutes from students answered questions correct in midterm exam and false in final exam. The second group composed of students correct answered the same four questions in both exams, False answered in midterm exam and correct answered in final exam, False answered in both exams. The difference between midterm exam and final exam grade was calculated. Data were analyzed with chi square test. Significance level was accepted as $p < 0.05$.

3. Results

As it is seen at Figure 1 that, 100% of students were correct answered the Question 1 and 57,60% of students were correct answered the Question 1 in midterm exam and false answered in final exam. 72,20% of students were correct answered the Question 2 and 53% of students were correct answered the Question 2 in midterm exam and false answered in final exam. 87,90% of students were correct answered the Question 3 and 83,30% of students were correct answered the Question 3 in midterm exam and false answered in final exam. 92,40% of students were

correct answered the Question 4 and 60,60% of students were correct answered the Question 4 in midterm exam and false answered in final exam.

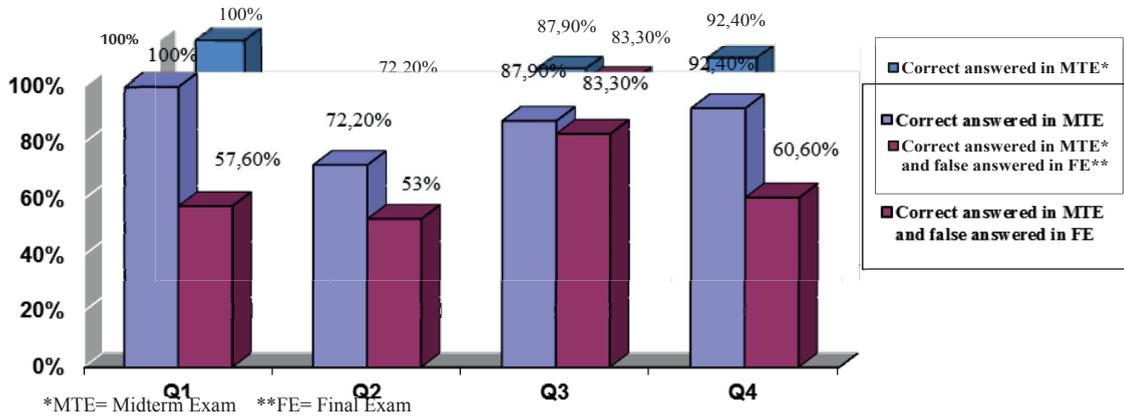


Figure 1. Distribution of students' answers in midterm exam and final exam

As it is seen at the Table 1 that, according to comparison of students' midterm and final exam answers, it was determined that, there were significant differences between students whose final exam grades reduced more than 40% and students whose final exam grades reduced 0%-40% for Question 1, Question 2 and Question 4 ($p < 0,05$). Among students correct answered Question 1, Question 2 and Question 4 in midterm exam and false answered in final exam, number of students whose final exam grades reduced more than 40% was significantly higher than the students whose final exam grades reduced 0%-40% ($p < 0,05$). There was no significant difference between groups for Question 3 ($p > 0,05$).

Table 1. Comparison of students' midterm and final exam grades

VARIABLES	Students whose final exam grades reduced more than 40%	Students whose final exam grades reduced 0%-40% (n)	Total	p**
	(n)	(n)		
Question 1	Other groups*	20	25	,000
	Correct answered in midterm exam and false answered in final exam	5	12	
Question 2	Other groups*	19	28	,015
	Correct answered in midterm exam and false answered in final exam	9	13	
Question 3	Other groups*	6	10	,525
	Correct answered in midterm exam and false answered in final exam	4	26	
Question 4	Other groups*	19	23	,000
	Correct answered in midterm exam and false answered in final exam	4	13	

* Correct answered in both exams, False answered in midterm exam and correct answered in final exam, False answered in both exams

** Statistical Significance

4. Discussion and Conclusion

In literature there are studies compare the multiple choice and essay type exams in courses has similar findings with our research. In a retrospective study involving 307 students who took a comprehensive final examination in physiology in 1997, 1998, and 1999, the data were collected from files in the Department of Basic Medical Sciences. Results suggest that students who failed the course were likely to be weak in both testing modalities, whereas students in all grade groups were more likely to perform better in the multiple choice questions than in the long essay questions for most students. It was also observed that scores for multiple choice questions compared with long essay questions were consistently higher in all groups, that is, students who had failed, passed, or received honors/distinctions. The average difference in the scores was 12 points for the group of students who failed the overall examination and was even larger for the other groups (Dagogo, Lauriann, & Robert, 2010).

In another study was designed to compare the performance of medical students in physiology when assessed by multiple choice questions and short essay questions. The study also examined the influence of factors such as age, sex, O/level grades and JAMB scores on performance in the multiple choice questions and short essay questions. A structured questionnaire was administered to 264 medical students' four months before the Part I MBBS examination. Apart from personal data of each student, the questionnaire sought information on the JAMB scores and GCE O' Level grades of each student in English Language, Biology, Chemistry, Physics and Mathematics. The physiology syllabus was divided into five parts and the students were administered separate examinations (tests) on each part. Each test consisted of multiple choice questions and short essay questions. The performance in multiple choice questions and short essay questions were compared. Also, the effects of JAMB scores and GCE O/level grades on the performance in both the multiple choice questions and short essay questions were assessed. The results showed that the students performed better in all multiple choice questions tests than in the short essay questions. JAMB scores and O' level English Language grade had no significant effect on students' performance in multiple choice questions and short essay questions. However O' level grades in Biology, Chemistry, Physics and Mathematics had significant effects on performance in multiple choice questions and short essay questions. Inadequate knowledge of physiology and inability to present information in a logical sequence are believed to be major factors contributing to the poorer performance in the short essay questions compared with multiple choice questions (Oyebola et.al.,2000).

In this study we compared the achievement differences of students in “Principles of Medicine” course. In this course students' achievement was assessed by midterm exam was designed as multiple choice type and by final exam was designed as an essay. It is suggested that students' characteristics such as learning strategies and other sociodemographic variables may affect the achievements. Further research is planned in order to determine relationship between students' learning strategies, sociodemographic variables, assessment methods and student achievement.

References

- Dagogo, J.P., Lauriann, E.Y. & Robert, G.C. (2010). A comparison of student performance in multiple-choice and long essay questions in the MBBS stage I physiology examination at the University of the West Indies (Mona Campus), *Advan in Physiol Edu* 34:86-89.
- Oyebola, D.D.O., Adewoye, O.E., Iyaniwura, J.O., Alada, A.R, Fasanmade, A.A, Raji, Y. (2000). A comparative study of students' performance in preclinical physiology assessed by multiple choice and short essay questions. *AfrJ Med Med Sci* 29: 201–205.
- Norman, G. (1995). Multiple Choice Questions Evaluation Methods. In *Evaluation Methods: A Resource Handbook*, The Program for Educational Development, Mc Master University. 47-54.
- Linn, R.L. & Gronlund, N.E. (1995). *Measurement and Assessment in Teaching*. Eight Edition, Prentice Hall, USA.
- Schuwirth, L.W.T & Van der Vleuten, C.P.M. (2004). Different written assessment methods: what can be said about their strengths and weaknesses?. *Blackwell Publishing Ltd Medical Education*, 38: 974–979.