

# An Initiative in Making Tests for Statistics Lessons

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**ABSTRACT**— *This article intends to provide an innovative way in multiple choice items to be in accordance with the standards of testing for statistics lessons. Tests are an essential part of learning process and the quality of the test content is always one of the concerns of teachers and academics. The proposed method in this article makes use of the tools available in WORD software and the mail merge section, Advantages of this technique include: (1) uniqueness, (2) being error free and (3) random positioning of options.*

**Keywords**— Excel software, Descriptive Statistics, Mail Merge, Mean, Multiple Choice, Test, WORD software.

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## 1. INTRODUCTION

Every educational program requires evaluation and evaluation entails testing. Tests are indicatives of success/failure both on the part of educational program and the learners. Making decisions on success/failure is based on the data gathered from a test. Thus, the significance of making tests is vital in educational process. Conventional tools and methods for test writing have their own merits and deficiencies. Alderson and Banerjee (2002) argue that bad tests could have negative impacts; therefore one expects that good tests should or could have positive impact on evaluation. One important aspect of increasing a test quality, therefore, is an appropriate tool a tester deploys to make tests, is the concordance between the curricular goals.

Progress tests have been classified into two types, namely, objective and subjective. What we concern in this article is the former which consists of true/false, matching and multiple choice items. In writing objective tests what testers focus on more is the stem, or lead of the item. In multiples choice items, distractors and the answer have to be written in such a way that meet the followings qualities 1) being logical, 2) unity of construction, 3) lack of repetition of lexical used in the stem, 4) avoidance of overlapping, 5) not being synonym or antonyms, 6) not using such choices as none of the above or all of the above.

The best multiple choice questions follow the suggestions of several authors (Conkin & Serra(1997); Cranton et al.(1997); Hoover(1980); Lowman(1995); Fuhrman(1996); Cranton(2000); Fenwick & Parsons(2000); Davis(2001)).

Criteria to be observed for making a multiple choice test, with regards to others make much trouble for teachers and testers. However, students are more willing to do multiple choice items for their exams. One reason for this possibly is the university entrance exam in Iran. The method for making a test based on the concepts of statistics used to measure learning. Questions in these tests will be considered by teachers in a test are the same shape and complexity do not follow. From one point of view, it is possible to calculate, and the variety of options in multiple-choice questions, test designers do not bother to do this carefully.

In Payame Noor University the majority of the final exam tests are multiple choice types. In open universities and virtual educational programs for every individual learner a unique test has to be designed so that the internal construct and the difficulty index to be the same for the applicants. The Studies done on the position of the right choice in tests reveal that test writers were eager to locate the right choice in B and C positions. In other words, tester's preference and influence have biased the position of the correct choice. (All the above results by the first author of this paper, the research report (in Persian) is available.)

Considering the fact that textbooks in basic sciences are not replaced very often, it is highly possible that test items to become repetitive which results in tests with similar context so that we cannot have a proper measurement and evaluation of a course taught during the term. With the advancement of computer technology, testing has also been very affected. Computers have much to offer particularly in test construction. Available soft wares provide various tools which testers can benefit from.

The aim of this article is to design multiple choice tests in office environment so that it can both save teachers time and prevent repetitive items in a test. This test is based on testing principles and is error free.

## 2. OFFICE ENVIRONMENT

Almost all of teachers have once typed a text in the WORD format. However, using its other tools and features needs much more skill. One of the WORD environment tools in the section of mailing is called Start Mail Merge. To learn how to work and use this section, one can refer to the sources which contain the seven skills.

A practical example for this device is the certificates of a firm issued to participants in a workshop. The text of the certificate is fixed and the same. However, for every participant the personal information is different. This capability is done through the connection of the WORD text to a data file such as Excel which reads and prints the applicant name and ID number, on the certificate.

In addition to creating a database, Excel has a potential ability to calculate the statistical functions. These available functions can help us to calculate the items exactly. These functions include the mean, median, range, variance, quartile and regression coefficients.

First, we choose the EXCEL database; other databases may also be used. One advantage of the EXCEL over others is the availability of office environment and various statistical functions which assist us to reach our goal.

## 3. PROVIDING AN EXAMPLE

One of the most common items in statistics lessons is the calculation of the mean. The rule is in such a way that some numbers are suggested and choices like figure (1) are to be considered. Choices in figure (1) can be replaced and written with other options.

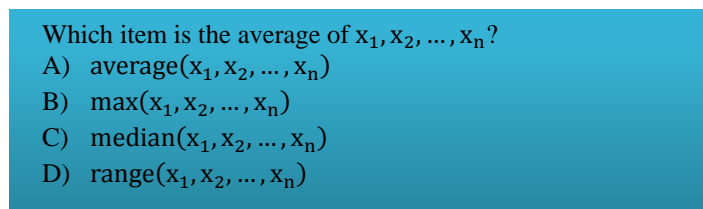


Figure 1: An example for an item

Then, we insert the item format in figure 1 into a file such as the one in figure (2). According to figure 2, the phrase “observed mean” is inserted in a column called “Text 1”. Based on the test developer viewpoint of how many observations are supposed to be included in the test to calculate the mean, columns entitled with “Text 2”, “Text 4”, “Text 6”, “Text 8”, “Text 10” are made. In all of these five columns, we use the product function of random number between 1 to 100 (RANDBETWEEN(1,100)). In column of “Text 11” the rest of the stem will be written down. The correct answer will be put in a separate column and three more columns will be designed for distracters.

At first, it seems the process takes much time, however, in a class, if you plan to administer several tests simultaneously with the same difficulty level, but with different items, one can then experience the usefulness of this method of test making.

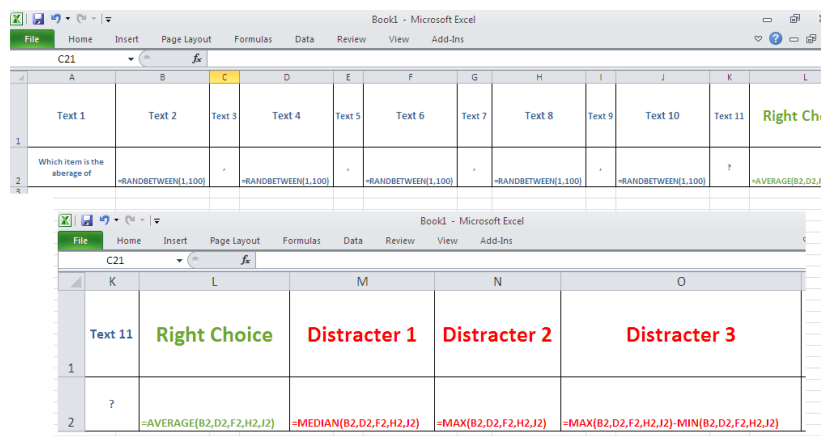


Figure 2: An example of an item in EXCEL context

Now, we connect this data file to a WORD page. Figure 3 shows that row 2 has been copied three times in figure 2 and it has been used in the WORD page. As one notices, the information in the context of the item and the choices are

completely different. For random positioning of the correct choice some other columns should be added in this environment (Abbasi, 2007).

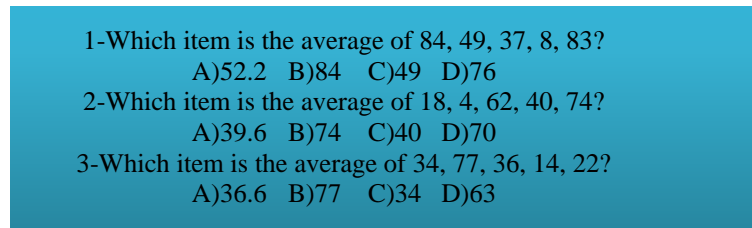


Figure 3: Process of the designed example after three times

By using this process for other items, one can have a reservoir of non-repetitive items.

#### 4. RANDOMIZATION OF ITEMS

In this section, we consider the twelve columns which have been provided in the EXCEL database to construct the options randomly. The first four columns include one for the right choice, and the three others for the distracters. In next four columns, the labels A, B, C, and D which are randomly made, are positioned. In the next four columns, according to figure (4), there exist the contents of the options which by the help of mail merge are placed in the stem of requires the item. This to write some commands which are shown in figure (4).

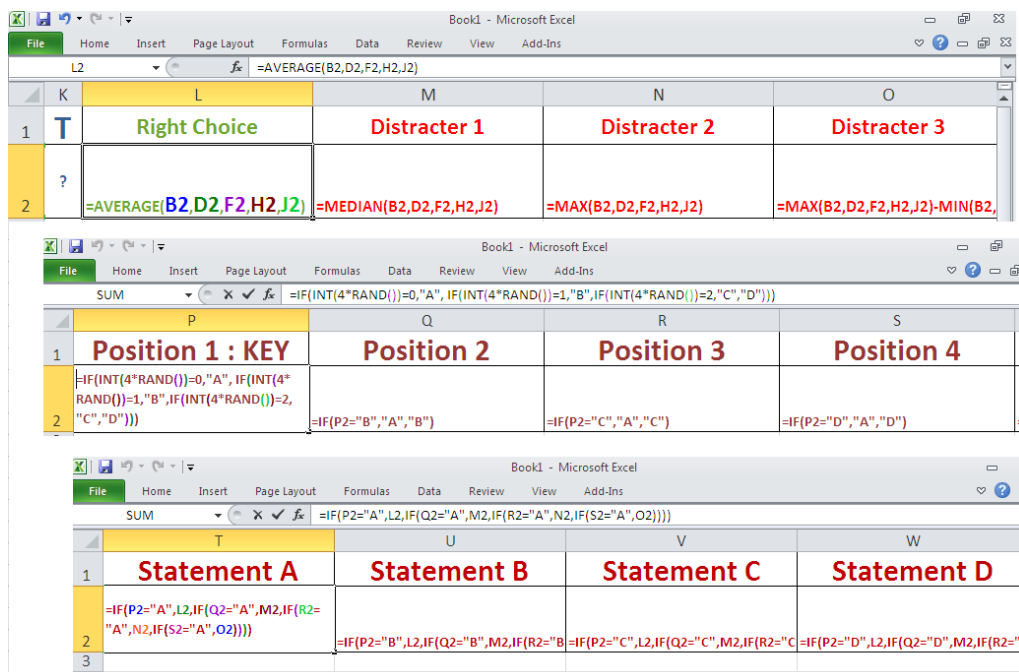


Figure 4: View from the randomized placement of options in a multiple-choice test

#### 5. CONCLUSION

In the process of making tests, especially in statistics field, calculation or using the statistics tables are of significant importance. In lessons such as plans of tests, methods of nonparametric calculations are very long that in many cases they are probably calculated erroneously which in turn, results in the omission of the item in the testing administering process. Problems of this type as well as those mentioned in this article are more frequent in tests. What this article offers is a simple solution through which electronic tests can repeatedly be used.

A variety of the designed example is available. Testers can alter the item difficulty level to simpler or vice versa. As an example:

*"What is the M for the mean observations of  $a_1, a_2, \dots, a_n$ , M equals to K?"*

In which  $a_1, a_2, \dots, a_n$ , and  $K$  are random quantities and  $M$  can be calculated from the formulas.

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