

## RESEARCH ARTICLES

### Students' Attitudes Toward *PowerPoint* Timed Quizzes

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**Objectives.** The objective of this study was to introduce a new technique for timed quizzes and to determine the attitudes of doctor of pharmacy (PharmD) students towards it.

**Methods.** Two groups of pharmacy students were included in the study. First-year students had a single exposure to this method, whereas second-year students were previously exposed to this method of timed quizzes. Students' perceptions regarding timed quizzes delivered using Microsoft *PowerPoint* software during the semester were evaluated using a questionnaire.

**Results.** Students had positive perceptions of the new techniques used. Students indicated that the technique was somewhat interesting, exciting, and useful, and saved material resources. Second-year students were more favorable towards the new technique compared with first-year students.

**Conclusions.** Timed quizzes delivered using Microsoft *PowerPoint* software saved resources, saved time, and increased students' ability to analyze information. As with any new technology, the effect of prior experience was evident. This method of delivering quizzes is useful for large classes and can be adopted efficiently.

**Keywords:** examination, quiz, Microsoft *PowerPoint*

## INTRODUCTION

Computer technology has rapidly progressed and become affordable, ubiquitous, and powerful in the academic field. Use of computerized testing methods has also become common practice during the past few years. Students usually have more favorable attitudes toward computerized learning and testing methods compared with paper-based handouts and testing.<sup>1</sup>

Unfortunately, in spite of widespread use of computer assessments, not much of the technology has been transferred to classroom assessments. Currently, computers are mainly used for delivering lectures in classrooms and teaching online courses.

One of the best techniques to assess student's performance may be testing them regularly by conducting "pop" or announced quizzes. Instructors are usually reluctant to conduct quizzes regularly due to the problems faced in delivering traditional paper-based quizzes, especially when the number of students in the classroom is large. The amount of time required to prepare such quizzes is another barrier. Not to mention the amount of resources used, especially paper, even if recycled. Hence, an emphatic argument could be made with respect to sav-

ing time and resources to develop an inexpensive tool using Microsoft *PowerPoint* software to deliver quizzes.

*PowerPoint* software is preinstalled on many new computers purchased by universities. The widespread use of Microsoft *PowerPoint* in classrooms is because it is relatively easy for instructors to use for developing slides and handouts, avoiding extensive training for time-constrained instructors. *PowerPoint* also can be used to assess students' knowledge of the information taught in the course on a regular basis. Although rapid growth in technology has already positively influenced the academic field, there is a lack of conformity on why and how technology should be incorporated into academia, what students should be taught using technology, and how to train educators to make use of technological advancements.<sup>2</sup> Students perceive that the most challenging issue for many older professors is learning how to make efficient use of instructional technology to enhance students' learning.<sup>3</sup> Hence, administrators usually seek strategies to make utmost use of computer technologies in innovative ways to improve efficiency in classroom lectures. The basic expectation associated with the incorporation of computer technology into academia is that it will enhance students' learning while significantly reducing instructional costs.<sup>4</sup> Thus, implementation of effective and inexpensive technology in classrooms is a major priority and a challenge for administrators. *PowerPoint* timed quizzes is one innovative attempt

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used by faculty at the University of Houston to assess student retention of information.

The development of quizzes using Microsoft *PowerPoint* is explained in the methods section. This method can easily be used to test various types of questions such as fill in the blank, multiple-choice, essay, matching, and k-type questions, as well as numerical calculation problems. Students view these quizzes just as they would any other *PowerPoint* presentation and mark their answers on a Scantron or sheet of paper. Previous studies have indicated that using the *PowerPoint* presentation technique for lecturing increases students' retention of information, grasp of material, organization, and satisfaction with the course.<sup>5-6</sup>

The objective of this study was to provide a description of how such timed quizzes can be developed using software packages currently available at most schools of pharmacy and to evaluate students' attitude towards such a method of delivering quizzes in a classroom setting. The authors hypothesized that with experience students would have positive perceptions regarding the new method of delivering timed quizzes.

## **METHODS**

### **Study Design**

An experimental study design was developed to test the study objectives. First-year PharmD students (P1) and second-year PharmD students (P2) enrolled in a 4-year Doctor of Pharmacy program (PharmD) at the University of Houston College of Pharmacy were selected for the study. The timed quizzes were the first exposure of first-year students to this method of testing; however, second-year students had used this test-taking method the year before. At the end of the semester, students were asked to indicate their views regarding the method used to deliver timed quizzes by completing a questionnaire.

### **Development of Quizzes Using *PowerPoint***

Six quizzes were administered during the semester; 2 for the first-year students and 4 for the second-year students. Most of the quizzes contained 5 multiple-choice questions. Different types of questions were asked, which included multiple-choice, true or false, fill-in-the-blank, and k-type questions, as well as numerical problems and essay questions. Each question was allocated a specific amount of time based on the instructor's experience. For example, basic memory questions that did not require any analytical calculation were allocated less time, while problem-based questions requiring calculations were allocated more time.

A total of 7 slides were developed for each quiz. The first slide contained instructions for students regarding

the quiz and also gave them some time to prepare to take the quiz. Usually this time was used to distribute the Scantron, and for students to write their identity number on it. Each subsequent slide had one question on it that students had to answer. Finally, the last slide thanked the students and contained instructions on handing in/submitting the answer sheet. Usually students were given some extra time to make sure they had marked their Scantron sheet properly.

Once the *PowerPoint* timed quiz started, it was not stopped; the presentation progressed to the next slide on its own. This was achieved by using the "rehearse timings" option under the "slide show" option of the *PowerPoint* menu bar. However, the instructor had the option to stop at any slide and allow more time for students if necessary. Stopping the presentation may be necessary for instructors who may not have adequate experience to accurately calculate how much time should be allowed for each question. An instructor can provide more time simply by clicking the left arrow key on the keyboard. These timed quizzes were delivered during regularly scheduled lectures and assessed students' understanding of the course material taught in the previous lectures.

### **Evaluation Instrument**

A 1-page questionnaire with 15 items that measured students' attitude towards timed quizzes was administered at the end of each semester. A 5-point semantic differential scale with anchors for each item was used to assess student attitudes. A copy of the questionnaire can be viewed in Appendix 1. The items measured student attitudes with respect to their excitement about the new technique, interests, resource savings, chances of committing errors, superiority of the new technique compared with traditional paper-based quizzes, and the effective use of times quizzes in every course. At the end of the questionnaire, there was a space provided for students to indicate any comments or suggestions.

### **Data Collection and Analysis**

The data were collected in April 2001, during the spring semester. The instructor distributed a total of 179 surveys at the end of the semester; 91 in the first-year class and 88 in the second-year class. Participation was voluntary and anonymous. Demographic data for 2 groups were collected through administrative databases. The demographic information was matched with the data by using a unique identity number mentioned on each evaluation instrument. Data were collected after students had received all quiz grades but before final grades for the course were posted. Data were then coded in a database and analyzed using the SAS statistical packages at

Table 1. Effect of Prior Experience in Student Perceptions With Timed Quizzes

Variables	P1	P2	Total
	Mean (SD)	Mean (SD)	Mean (SD)
Exciting - Boring*	3.26 (0.85)	3.18 (1.03)	3.22 (0.94)
Interesting -Uninteresting*	3.36 (0.96)	3.29 (1.08)	3.33 (1.02)
Better than paper based - Worse *†	2.63 (1.31)	3.20 (1.41)	2.92 (1.39)
Confusing - Clear	3.14 (1.25)	3.44 (1.25)	3.29 (1.26)
Save resources - Does not save resources*	4.39 (1.01)	4.16 (1.20)	4.28 (1.11)
Useful-Not useful*	3.27 (1.19)	3.40 (1.13)	3.33 (1.16)
Needed more time - Adequate time given	2.29 (1.29)	2.57 (1.46)	2.43 (1.38)
Continued - Discontinued*	2.96 (1.25)	3.32 (1.35)	3.14 (1.31)
Good - Bad*	3.05 (1.19)	3.33 (1.29)	3.18 (1.24)
Should be used in every class - Should not be used in every class*	2.14 (1.14)	2.41 (1.36)	2.27 (1.25)
Stimulating - Depressing*	3.07 (1.05)	3.07 (1.23)	3.07 (1.14)
Mimic realistic situations - Does not mimic realistic situations*	2.91(1.09)	3.19 (1.17)	3.05 (1.14)
Increases errors - Reduces error*†	2.29 (1.14)	2.94 (1.22)	2.61 (1.22)
Dislike - Like	2.53 (1.16)	2.71 (1.27)	2.62 (1.21)
Needs more efforts - Needs less effort †	1.98 (0.94)	2.33 (1.01)	2.15 (0.98)

\* All these items were reverse coded for the purpose of analysis.

† p<0.05 difference between two groups

P1 = first-year PharmD students; P2 = second-year PharmD students

a set priori significance level of 0.05. Descriptive analyses were performed to understand students' attitudes towards timed quizzes. In addition, comparative analysis using the Wilcoxon-Mann-Whitney test was performed to see if prior experience influenced students' perceptions regarding timed quizzes.

## RESULTS

The average time allocated for each question was around 1 minute, with a range from 30 seconds to 2 minutes. The average time allocated to view the first introductory slide was 30 seconds, while that for the closing slide was 45 seconds. The total time required to conduct the quizzes ranged from 5 minutes to 8 minutes. Most quizzes ( $n = 5$ ) had 5 multiple-choice questions each (96%). One quiz for the second-year students, had only 2 questions, one of which was an essay question. Multiple-choice questions were further classified as concept-based questions (35%), true/false questions (27%), problem-based calculations (15%), definitions (11%), k-type questions (8%), and matching (4%).

The data collection method resulted in 171 completed surveys and a response rate of 96% (P1=88 [97% response rate] and P2=85 [96% response rate]). The mean age for students was 23.39 ( $\pm 4.01$ ) years for P1 and 23.58 ( $\pm 4.15$ ) years for P2, with the majority of students in both the groups being female (P1=80.43%, P2=71.64%). Approximately 13% of the students were married. The two groups did not differ significantly

( $p > 0.05$ ) based on demographic characteristics. Students were ethnically diverse, with the majority being Asian/Pacific Islander (54%), followed by White (27%), African Americans (11%), Hispanic (7%), and Native American (1%).

Descriptive analysis performed on students' attitude towards this process indicated some interesting results (Table 1). Overall students found the new technique somewhat exciting ( $3.22 \pm 0.94$ ) and slightly more interesting ( $3.33 \pm 1.02$ ). Students indicated the new technique was a little more clear ( $3.29 \pm 1.26$ ) and to some extent useful ( $3.34 \pm 1.16$ ). Also, students thought that the new technique saved resources ( $4.28 \pm 1.11$ ). Furthermore, students believed the process increased their ability to concentrate compared with paper-based quizzes ( $2.15 \pm 0.98$ ). They were mostly neutral with respect to the item regarding timed quizzes being stimulating ( $3.07 \pm 1.14$ ) and whether the quizzes mimicked realistic situations ( $3.05 \pm 1.14$ ). Some students indicated that they disliked timed quizzes ( $2.62 \pm 1.21$ ) and thought that this new technique increased the chances of committing errors ( $2.61 \pm 1.22$ ). In addition, they indicated that the time given for the quizzes was not adequate ( $2.43 \pm 1.38$ ).

Comparative analysis using the Wilcoxon-Mann-Whitney test yielded some interesting results. More first-year students than second-year students indicated that the *PowerPoint* quizzes increased their chances of committing an error ( $P < 0.05$ ). On the other hand, more sec-

ond-year students than first year students believed that the quizzes were better than paper-based quizzes ( $P<0.05$ ). Also, more second-year students than first-year students indicated they needed less effort to concentrate on quiz questions ( $P<0.05$ ) (Table 1).

## DISCUSSION

Timed quizzes are an interesting technique for delivering quizzes in a classroom. As with any new and innovative system, there is always a concern as to how students will perceive it. This study clearly indicates that students had positive attitude towards the delivery of timed quizzes. Students found the method exciting and interesting. Further, most students indicated that timed quizzes were clear, useful, and stimulating. These are the key factors that enhanced the adaptability of timed quizzes. Since the technique required more concentration, it may help students to concentrate while taking quizzes. This sentiment was noted in the written comments provided by students. Some students indicated that the "quizzes are very stimulating" and that this method of testing "keeps student alert!" Other students echoed a similar opinion, "I think the quizzes conducted in this manner are very good!" The findings of this research are similar to those of a previously reported study on attitudes of students toward *PowerPoint* presentation of quizzes used during lectures in a comparative politics course.<sup>3</sup> Use of *PowerPoint* for delivering lectures has always been appreciated by students.<sup>5,6</sup> Similarly, students in this study indicated favorable views towards using *PowerPoint* timed quizzes in the classrooms.

Like any new method used in the classroom, the effect of prior experience may be critical. The well-documented direct relationship between computer experience and computer attitudes reflects this phenomenon.<sup>7-13</sup> When a new technique is used for the first time and experienced for the first time by students, there is usually apprehension, especially when it is used in only select courses. However with time and experience, better technology is usually evaluated positively.<sup>14</sup> As students get accustomed to the new technique, and as word gets passed down from senior students to junior students, the apprehension factor gradually diminishes. Results of this study indicate that with previous experience students were more comfortable in adapting to this new technology. The most interesting finding of the study was that second-year students were found to be more favorable towards timed quizzes compared with first-year students. Second-year students found these quizzes better than traditional paper-based quizzes and they did not think that this new technique increased their chances of committing

errors. Favorable attitudes toward the new technique by second-year students clearly indicate that, like any new system being implemented, the amount of experience with the system affects individuals' perception of the system. This behavior is consistent with the theory of reasoned action, which states that previous experience helps in forming better perceptions.<sup>15</sup>

Since this study used *PowerPoint* to deliver quizzes, unlike other studies in which *PowerPoint* was mainly used for lecture delivery, there were certain issues that are important and worth noting. Furthermore, limitations of this method and the study design should be considered before implementing a similar testing method at other institutions. This study did not have a control group. The use of timed quizzes may not be possible in every course, as also indicted by students in this study. Some students did not feel the time given to view each question was adequate. The time given for each question was approximately 1 minute, which may not be sufficient for some students. As faculty members gain experience in this process, the estimation of the time required per question should improve. We found that with experience, students indicated they were less prone to committing errors. Also, the majority indicated favorable attitudes toward adapting to this new technique as some students commented, "they are fine, but more time should be given if needed for questions." This issue can be easily resolved by allocating more time as required by students. This can be achieved while the quiz is in progress too. However, extra time should be allocated only if most students need it, since one of the aims of this approach is to train pharmacists to think efficiently. Furthermore, a system can be easily developed using the *PowerPoint* software to allow additional time for students to review earlier questions after all the questions for the quiz have been viewed once. A template is being developed that will include a clock, which will allow students to see the amount of time left or allocated for each question. Whether the use of a clock will be useful or a distraction is yet to be studied.

Since the 2 students groups were tested independently and there was no control group, assessing the effect of the testing technique on students' grades was difficult. Further research using a control group to analyze the effect of *PowerPoint* timed quizzes compared with paper-based quizzes on students' grades would be interesting. Since all students were reading from a common screen, it was very easy for the proctors as well as the instructor to view student's eye movements during the quiz, thus reducing the possibility of cheating.

In contrast to online quizzes, which require more time and skills to create, *PowerPoint* timed quizzes have advan-

tages such as simplicity, ease, and adaptability. As opposed to creating online quizzes for which an administrative assistant or faculty member with the appropriate computer skills would be required, *PowerPoint* timed quizzes are simple. Developing these quizzes does not require much time and will certainly be beneficial for most professors stressed for time in a busy academic environment.

These quizzes required that a specific amount of time be allocated for answering each question, which is usually not required when creating traditional quizzes or examinations. The most important aspects of the timed quizzes are that they save resources, save time, and increase students' ability to analyze information effectively, and were perceived as such by students. On average, the process saved approximately 2300 sheets of paper for one course in only one semester; the numbers would be huge if adopted in many courses. Per quiz, this technique saves an average of 30 minutes of the faculty member's time that is traditionally spent copying the test material and conducting the quiz. Thus, timed quizzes are economical in terms of time as well as money saved. As a result of this study, a few other faculty members at the institution who see the benefit of using timed quizzes have adopted this innovative technique.

## CONCLUSIONS

Introduction of timed quizzes in the classroom setting was found to be a useful technique by the faculty at our institution. Students had positive perceptions towards the use of such a technique and with experience their perception and adaptability was enhanced. As more faculty members adopt this new technique in the classroom, student will be at ease with taking timed quizzes. The technique of timed quizzes is especially useful for any course in which a large number of students are enrolled. In the era of diminished resources, the widespread use of *PowerPoint* software to deliver timed quizzes can definitely lead to significant savings in time and resources.

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Appendix 1. Evaluation Instrument

Please indicate your opinion regarding the timed Quizzes you took in this course. There is no right or wrong answer. Indicate your response using the scantron provided. Please note that while making your choices please do not let the grades that you received for each individual quiz influence your response.

Exciting	1	2	3	4	5	Boring
Interesting	1	2	3	4	5	Uninteresting
Better than paper based	1	2	3	4	5	Worse than paper based
Confusing	1	2	3	4	5	Clear
Saves resources (paper)	1	2	3	4	5	Does not save resources (paper)
Useful	1	2	3	4	5	Not useful
Needed more time	1	2	3	4	5	Adequate time given
Should be continued	1	2	3	4	5	Should be discontinued
Good	1	2	3	4	5	Bad
Should be used in every class	1	2	3	4	5	Should not be used in every c lass
Stimulating	1	2	3	4	5	Depressing
Mimic realistic situations	1	2	3	4	5	Does not mimic realistic situations
Reduces error	1	2	3	4	5	Increases errors
Dislike	1	2	3	4	5	Like
Needs more effort (concentration)	1	2	3	4	5	Needs less effort (concentration)