

## Effect of online quizzes on music theory achievement of freshman music teaching students

Hatice Çelikleş<sup>1</sup>, Rasim Erol Demirbatır<sup>2</sup>

<sup>1</sup>Music Educator and Freelance Researcher, Bursa, Turkey

<sup>2</sup>Music Education Department, Faculty of Education, Bursa Uludağ University, Bursa, Turkey

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### ABSTRACT

This research examined the effects of online quizzes on the music theory achievement of freshman music teaching students. For this purpose, the students who took the Western Music Theory and Practice I course were determined as the study group and experimental research was conducted. A pre-assessment test was given to determine students' knowledge level about music theory and the median value of the test was determined as the cut-off point. The cut-off point was established as the experimental group, while the cut-off point was established as the control group. In the semester, four online quizzes were given to the experimental group apart from the midterm and final exams. Finally, a final test was applied to whether there was a significant difference between the groups. Consequently, there was no significant difference between the two groups. However, it was seen that the experimental group scores are slightly higher than the control group scores, thus the experimental group achieved the success of the control group. When it was compared to the pre-assessment test scores, it shows that the students in the experimental group achieved a remarkable positive difference in the process. The discussion includes recommendations about the use of online quizzes.

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### Corresponding Author:

Rasim Erol Demirbatır

Music Education Department, Faculty of Education, Bursa Uludağ University

Görükle Kampüsü, 16059, Nilüfer/Bursa, Turkey

Email: redemir@uludag.edu.tr

## 1. INTRODUCTION

Distance education quickly took the first place on the agenda of education activities with the COVID-19 pandemic which entered our lives as of March, 2020. During the pandemic, educational activities were mostly carried out through online platforms and also were supported by learning content offered by television and other media in some countries [1]. In Turkey, face-to-face education was suspended in primary, secondary schools, and universities in this process, and distance education was started via online platforms within the opportunities of the Ministry of National Education (MoNE) and universities [2], [3]. This process, which deeply affects the daily living conditions, has brought many positive and negative developments in education as well. More use of blended learning approaches (online and face-to-face), better perception and appreciation of the role of teachers and the schools by the society, more widespread use of good learning materials, more active participation of the students in lessons through visual and auditory materials, and the increase in cooperation between teachers can be considered among the positive developments [2], [4], [5]. It can be said that the process also creates opportunities for the revision of the basic issues related to the philosophy of education and the transformation of education policies into a “more inclusive and fair structure” [4]. On the other hand, increasing inequality of opportunity, learning difficulties,

and school dropout rates, experiencing learning losses, decreasing access to healthy nutrition, increasing domestic violence and abuse, staying away from education for girls and refugee groups can be counted among the most common negativities experienced worldwide [1], [4], [6].

The process changed the general course of educational activities with many dimensions. It also affected the measurement-evaluation processes, and made it necessary to review these practices. In the reports of OECD and UNESCO, it was stated that there were difficulties in the measurement process [4], [7], [8]. The administration of the exams and the grading system of many courses have changed [1], [3]. While some universities have preferred an evaluation model such as pass/fail instead of a letter grade system, some universities have made retrospective adjustments in the curriculum and even in the exams, and some have allowed students to freeze registration [3], [9]. The purpose of these decisions were to ensure the fairness of grades in the measurement and evaluation processes and to prevent some students from falling into an advantageous or disadvantageous situation in the future [3].

In addition, measurement and evaluation practices have already been designed and maintained online within the scope of distance education in many universities. But reasons, such as the inability of all students to have the necessary technological opportunities, the inadequacy of students and teachers in using technology, and the inability to access computers and the internet, have prevented the measurement and evaluation processes from keeping in a qualified manner [10]. In this period, while the result-oriented measurement and evaluation methods (multiple-choice tests, true-false items, matching items) were mostly preferred, the process-oriented measurement and evaluation methods (performance evaluation, peer evaluation, portfolios) were used less frequently [11], [12]. This process showed that measurement and evaluation practices should be reviewed in the long term. Besides, it is seen that educators should improve themselves on alternative measurement models as well as information technologies.

One of the measurement methods that can be preferred during the pandemic process are quizzes. Quizzes allow students to be observed periodically and help identify problems encountered in learning. They also help to determine the level of students' achievement of target behaviors and provide feedback to students [13]. They are easy to apply and functional for online and distance learning, and also allow students to be observed at certain periods, and eliminate the problems experienced in the process [3]. It is stated that in the literature online quizzes are useful as a teaching and assessment tool [14]. They are effective in increasing exam performance and academic achievement [15]–[17] and better in increasing success than in-class exams [18], [19]. Also, it was found that online quizzes are effective to encourage students and they are time-efficient for educators [13], [20], [21].

In this context, the aim of this research is to examine the effects of online quizzes on the music theory achievement of the freshman music teaching students. Western Music Theory and Practice (WMTP) I and WMTP II courses are one of the essential courses in the first two semesters of the music teaching undergraduate program. In addition to the basic concepts of music theory, the content of the courses includes information that supports and complements musical hearing, reading and writing skills [22]. Thus, these courses include very intensive acquisitions related to musical knowledge and skills. Music teaching undergraduate program admits students from different types of high schools (general high schools, fine arts high schools, vocational high schools). This situation causes the musical knowledge levels of the students to be different from each other. Therefore, the achievement of the WMTP I course is important, since it forms the basis for the other courses and includes learning outcomes related to music theory. For this reason, online quizzes were applied to students in addition to midterm and final exams during the pandemic. It was tried to be beneficial in eliminating the difficulties faced by the students and aimed to increase academic achievement. It is thought that the research is important in terms of giving an idea about the use of online measurement methods in the post-pandemic period.

## 2. RESEARCH METHOD

### 2.1. Design

The model of this research was determined as the regression discontinuity design as shown in Table 1. Regression discontinuity design is defined as a design that used for deciding whether a group of participants providing predetermined criteria benefited from the given intervention [23]. Accordingly, the following process was followed in the selection of this model in the study: i) Students' knowledge levels of the music theory who studied the WMTP I course in the 2020 Fall semester was determined by a pre-assessment test made at the beginning of the semester; ii) The median value of the pre-assessment test results was accepted as the cut-off point. While the students median were determined as the experimental group, the students the median were determined as the control group; iii) Experimental group was periodically applied four quizzes except for midterm and final exams; iv) At the end of the semester, in the scope of the final exam, a final test was applied to all students (both the experimental group and the control group) again. Thus,

it was aimed to determine whether there is a significant difference between the knowledge levels of the experimental and control groups in according to final test. The research design is given in the Figure 1.

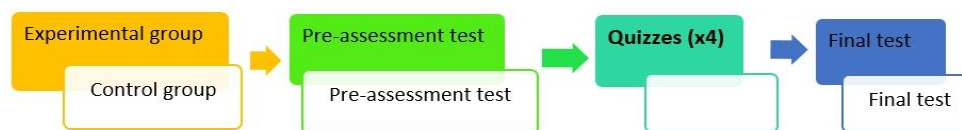


Figure 1. Research design

## 2.2. Study group

The study group of the research consisted of 51 students who took the WMTP I course in the Fall semester of the 2020-2021 Academic Year. However, seven students who did not follow the course and four students who did not participate in the pre-assessment test were not included in the research, so it was carried out with 40 students. In the first session of the course, a pre-assessment test consisting of 40 multiple-choice questions was applied to students, and it was determined that the success levels of the students varied considerably. Statistical information regarding this pre-assessment test is given in the Table 1.

Table 1. Statistical information about pre-assessment test

|                     | N  | $\bar{X}$ | Median | Minimum | Maximum | S     |
|---------------------|----|-----------|--------|---------|---------|-------|
| Pre-assessment test | 40 | 51.50     | 51.25  | 22.50   | 77.50   | 13.42 |

In the determination of the experimental and control groups of the research, the median of the pre-assessment test (51.25) was determined as the cut-off point. Accordingly, the scores the median were determined as the experimental group, and the scores the median were determined as the control group. Statistical information about the experimental and control groups is given in the Table 2.

Table 2. Statistical information about the experimental and control groups

|                    | N  | $\bar{X}$ | S    |
|--------------------|----|-----------|------|
| Experimental group | 20 | 40.50     | 8.14 |
| Control group      | 20 | 62.50     | 6.98 |

## 2.3. Process

In the content of the WMTP I course, there are basic concepts related to music theory (measure, rhythm, and clefs; tempo markings, dynamics, and expression terms; ornaments) and information that assists and complements musical hearing, reading, and writing skills (intervals, chords, tonality, major-minor scales) [22]. Hence, the quizzes which applied to the experimental group were prepared according to the course contents. During the semester, four online quizzes were applied periodically. The contents of the quizzes are listed in the Table 3.

Table 3. Content of the quizzes

| Quiz | Date              | Content                                                                                                                                                                                                              | Number of questions          |
|------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| 1    | October 27, 2020  | Musical sound and its features<br>The principles of staff notation<br>Rhythm, meter, and beat                                                                                                                        | 12 multiple choice questions |
| 2    | November 17, 2020 | Intervals: Simple, compound, chromatic and enharmonic intervals,<br>interval inversion, consonant and dissonant intervals.<br>Tempo markings<br>Dynamics                                                             | 12 multiple choice questions |
| 3    | December 15, 2021 | Triads: Major, minor, diminished and augmented triads and their<br>inversions<br>Tonality: Key signature; major and minor scales; the circle of 5th;<br>relative, parallel, and enharmonic keys.<br>Expression terms | 12 multiple choice questions |
| 4    | January 08, 2021  | Ornaments<br>Abbreviations                                                                                                                                                                                           | 6 multiple choice questions  |

The quizzes, designed as five multiple-choice tests, were prepared by the researchers and applied on the e-exam platform for the distance education provided by the university. They were defined at any time except for the weekly WMTP I courses. According to research conducted by Brothen and Wambach [24], timed electronic quizzes are better to enhance exam performance more than untimed quizzes. In addition to this, it was found that they are associated with better learning because of reducing the opportunity to look up answers. So, for each quiz, 10-15 minutes were given according to the number of questions and the intensity of the questions. When the students exceeded the time limit, the system was closed automatically and hold the students' answers.

#### 2.4. Data collection tools

A five multiple choice test which consists of 40 questions includes all topics in quizzes was prepared for the tests as seen in Table 3. The test was prepared by the researchers who are also the instructors of the course, and it was presented to get opinions from the three field experts. In addition, it was applied to the students who took the course in the Fall Semester of the 2019-2020 Academic Year. So, the final version of the test was obtained with this pilot application.

#### 2.5. Data collection and analysis

As seen in Table 4, while the pre-assessment test data of the study were collected in the first session of the course, the final test data were collected within the scope of the final exam of the course. For both tests, participants were given 40 minutes for 40 questions. In order to analyze the data, it was checked whether the scores of the experimental and control groups from the tests were normally distributed. Since the number of participants in both groups were less than 30, the Shapiro-Wilk test was preferred [25]. When Table 5 is examined, it is seen that the pre-assessment test and final test scores of both groups provide the normal distribution conditions ( $p > 0.05$ ). Accordingly, independent samples t-test was used to analyze the data in the research.

Table 4. Data collection calendar

| Application         | Date             | Number of questions           |
|---------------------|------------------|-------------------------------|
| Pre-assessment test | October 8, 2020  | 40 five multiple choice items |
| Final test          | January 14, 2021 |                               |

Table 5. Shapiro wilk test results of the groups

| Pre-assessment test |               | Final test         |               |
|---------------------|---------------|--------------------|---------------|
| Experimental group  | Control group | Experimental group | Control group |
| 20                  | 20            | 20                 | 20            |
| 40.50               | 62.50         | 77.83              | 77.00         |
| 8.14                | 6.98          | 13.65              | 11.23         |
| 0.09                | 0.45          | 0.16               | 0.26          |

### 3. RESULTS AND DISCUSSION

#### 3.1. Results

To determine the effect of the online quizzes on music theory achievement, WMTP I final test mean scores of the experimental group (students with a pre-assessment test score of less than 51.25 and who were applied online quizzes) and control group (students with a pre-assessment test score of 51.25) were compared with the independent sample t-test. The results of the independent sample t-test of the WMTP I final test revealed in Table 6.

Table 6. The independent sample t-test results of the WMTP I final test

| Groups                        | N  | $\bar{X}$ | S     | sd | t     | p    |
|-------------------------------|----|-----------|-------|----|-------|------|
| Experimental group (< 51.25)  | 20 | 77.83     | 13.65 | 38 | -2.11 | 0.85 |
| Control group ( $\geq$ 51.25) | 20 | 77.00     | 11.23 |    |       |      |

According to the test results, no significant difference was found between the final test mean score of the experimental group ( $\bar{X}_{\text{Experimental}}=77.83$ ) and the final test mean score of the control group ( $\bar{X}_{\text{Control}}=77.00$ ) [ $t(38)=-2.11$ ,  $p > 0.05$ ]. However, it is seen that the average score of the students in the experimental group who were applied online quizzes was slightly higher than the students in the control group who did not receive online quizzes. This result of the study can be interpreted as online quizzes having

a positive effect on students' music theory achievement levels. In fact, when we look at the results of the pre-assessment test, it is seen that the mean score of the experimental group ( $\bar{X}=40.50$ ) are considerably lower than the mean score of the control group ( $\bar{X}=62.50$ ). Despite the noticeable difference between these two groups in the pre-assessment test, when we look at the final test scores, we see that the two groups' scores are almost equal. So, the results also show that the students in the experimental group achieved a remarkable positive difference in the process.

### 3.2. Discussion

In this research, it was examined that the effects of online quizzes on the music theory achievement of the freshman music teaching students. As a result of the experimental research, no significant difference was found between two groups. However, the results seem worthy of discussion. Although the data obtained from the final test show that the results of both groups are close to each other, there is a slight difference in favor of the experimental group. In addition to this, when the pre-assessment test scores of the two groups are examined, there is a serious difference between them and the control group scores seem to be higher. This experimental research was carried out since the music theory knowledge levels of some students (experimental group) were at a critical level. With this research, also, the knowledge levels of the experimental group students were tried to be equalized and homogenized with the control group. When evaluated from this point of view, it can be said that the research has achieved its purpose and that online quizzes have a positive effect on student success. Regular online quizzes provide more interaction between the student and course material than exam, in addition to this, the frequency of the quizzes helps to learn smaller information more easily [16]. In this research during the semester, 4 quizzes applied and each of them included more than one topic. Accordingly, a more effective outcome can be obtained by applying different quizzes for each topic and by increasing the number of quizzes. Further studies, the effect of frequent quizzes can be examined on students' achievement and exam performance.

In the pandemic period when distance education is inevitable, online quizzes ensured great benefit in keeping students interested in the course and keeping their performance high. In this research, the quizzes were administered on the days following the presentation of related topics in the course and in extracurricular times. Thus, the students had the opportunity to study and review the related topics. Also, giving each quiz after a very short time helped the information to be remembered. For the quizzes, 10-15 minutes were defined in accordance with the content, so that the students were not given the opportunity to benefit from any source during the quiz. Similarly, in the literature, it was stated that keeping the quizzes duration short and preventing access to course materials increased the student's performance [20], [24].

In a study, it was stated that quizzes changed the study habits of students, and they started to study more frequently and earlier than the exam period [26]. In our study, although no significant difference was found, considerable improvement was observed in the performance of the experimental group compared to their initial knowledge. For this reason, it can be recommended to use online or in-class quizzes in other theoretical courses in music teaching undergraduate programs with different arrangements suitable for the structure of the course, group and content. Although preparing quizzes and uploading them to the e-exam platform brings a certain amount of workload for the educator [13], obtaining the exam results quickly and automatically by the system can be one of the greatest conveniences of online quizzes. In addition, it can be seen as one of the advantages of online quizzes that extracurricular times can be determined for them, therefore the class time is not affected [20].

In this research, at the end of each quiz, students were able to see their exam grades, but they did not receive feedback on their correct/incorrect answers. Research shows that giving feedback to students is effective and increase the exam performance [17], [27]. In further research, feedback can be given at the end of each question [16] or upon completion of the quiz. In addition to providing information only on correct/incorrect answers [26], there are also studies including additional information and resources about the related topic [16]. For this reason, it is recommended to conduct studies examining the effect of online quizzes provided with feedback to music educators. Since pre-lecture quizzes encourage learning and provide students with a deeper understanding of the subject [28], instead of post-lecture quizzes, pre-lecture quizzes can be tried. Also, the contribution of the quiz grade to the course success grade can be provided to ensure that the students participate in the quizzes completely. Finally, the effect of unannounced quizzes at the end of the lesson can be examined. Since it is necessary to be ready for the exam at all times, it is thought that unannounced exam types which increase the student's motivation to study [29], can also have a positive effect on student success.

#### 4. CONCLUSION

As understood from the outputs of this research and the literature, online quizzes seem to be effective on student success and exam performance. As seen in the literature, quizzes are practiced in very different ways, such as online or in-class quizzes, pre-lecture or post-lecture quizzes, unannounced or announced quizzes, and with feedback or without feedback quizzes. According to the class, course, course content, and group, one of these quizzes could be chosen and applied. So, in order to obtain the best efficiency from the quizzes, the characteristics mentioned should be well analyzed. In addition, by applying different types of online quizzes, it could be concluded which quiz type is more suitable for the related course and content.

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**BIOGRAPHIES OF AUTHORS**

**Hatice Çeliktaş**    is a music educator and freelance researcher. She received her bachelor's degree (2010) and master's degree (2014) in Music Education at Uludağ University. She worked as a research assistant at Bursa Uludağ University between 2011 and 2020. In 2021 she received her doctoral degree on ear training activities with children and Kodály approach at Bursa Uludağ University. She can be contacted at email: haticeliktas@gmail.com.



**Rasim Erol Demirbatır**    is a lecturer at Bursa Uludağ University Faculty of Education, Department of Fine Arts Education. He holds Ph.D. Degree in Music Education from the Gazi University in Turkey. He continues his research in various fields of music education. He can be contacted at email: redemir@uludag.edu.tr.