



The Relationship between Attitudes toward Technology and Openness to Innovation of Academicians Teaching Music Remotely*

Ebru ÇOCAR** , Ekin ÇORAKLI KAHRAMAN***

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ABSTRACT

The present study aimed to determine whether there is a correlation between the attitudes of music academicians who teach music remotely toward technology and their level of openness to innovation, and to examine if these attitudes and levels vary according to certain variables. The study sample was composed of a total of 74 music academicians working in the faculties of education, conservatories, and faculties of fine arts of universities in various regions in Turkey in the academic year of 2020-2021. Using relational screening model, the present study compiled data through the 'Attitudes toward Technology Scale' by Akbaba Altun (2003), and the "Characteristics of Innovative Teachers Scale" of Kocasarac (2018). Pearson Correlation Analysis was employed to determine the relationship between academicians' attitudes toward technology and their levels of openness to innovation, and these attitudes and levels were analysed according to certain variables through t-test, Mann-Whitney U, Kruskal-Wallis, and ANOVA test methodologies. The findings indicated a high positive correlation between the attitudes toward technology and levels of openness to innovation of academics teaching music remotely. In addition, it was found that academicians' levels of openness to innovation and attitudes toward technology did not significantly differ according to gender, level of education, and their fields of expertise.

Keywords: Music education, music educators, openness to innovation, attitude toward technology, distance education

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1. INTRODUCTION

In the 21st century, also referred to as the information age, individuals are exposed to technology from the moment they are born. In this age where information is easily accessible, technology is earning itself an increasingly prominent position in education. Reasons such as increasing population, difficulties in transportation, diverse student profiles, the importance placed on saving time, measures enforced during pandemics, etc. have triggered the need for the use of technology in education, while ever-increasing technologies have met the specific requirements of how education is maintained. With the breakout of the Covid-19 pandemic in late 2019, many schools throughout the world had to put a rapid halt on face-to-face education, but thanks to technological developments and in sharp contrast to previous pandemics, they have been able to continue their teaching on-line (Kondrashova, 2020).

As with other realms of education, music education has made intensive use of latest technologies. Thanks to interactive software, musical training in several areas such as theories of music, history of music, instrument, and voice education, and even hearing training aimed at improving the musical ear through software that progresses gradually can be provided online (Levendoglu, 2004). In addition, innovations in digital formatting offer individuals many conveniences in searching for, sharing, editing, and writing music on various platforms, and these innovations do not only change the way people interact musically but provide them with an opportunity to enjoy music more (Dittmar et al., 2012).

Novel approaches arise in education in response to the constant change in our modern world, and the acceptance and adaptation of both teachers and students to these approaches is an important stage. Scientific studies and revisions based on

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** Ph.D. Student, Bolu Abant İzzet Baysal University, Faculty of Education, Department of Fine Arts Education, Division of Music Education, Bolu-TÜRKİYE e-mail: ebru.cocar@gmail.com (ORCID: 0000-0002-5285-1582)

*** Assoc. Prof. Dr., Bolu Abant İzzet Baysal University, Faculty of Education, Department of Fine Arts Education, Division of Music Education, Bolu-TÜRKİYE e-mail: ekincorakli@gmail.com (ORCID: 0000-0001-8372-2751)

these may allow for a smoother transition. The scientific world has devoted close attention to perceptions and attitudes of the most important elements of education, i.e., teachers and students, toward new technologies in every realm and level of education (Deniz et al., 2006; Erten, 2019; Kahraman, 2013; Karakan, 2020; Suzek Birkollu et al., 2017). A review of the relevant literature shows that, as with other realms of education, music education research has looked into digitization and distance education systems (Adileh, 2012; Brändström et al., 2012; Can and Yungul, 2017; Canbay and Nacakci, 2011; Koutsoupidou, 2014; Orman and Whitaker, 2010; Sağır et al., 2014; Sakarya and Zahal, 2020; Shoemaker and Stam, 2010; Ørngreen et al., 2012). Research on distance music education has indicated that synchronization problems are common due to internet infrastructure, and there are limitations of crucial aspects of face to face education such as eye contact, modelling, body language, physical contact, and marking on notes, whereas there is the convenience of being able to pause, rewind, or fast-forward the videos in asynchronous courses, and in cases where face to face education is no longer possible due to such problems as transportation, distance education could replace face to face education. In addition, several studies that compared digitized music courses and traditional ones (Karahan, 2016; Okan, 2017) showed that the two did not significantly differ in learning outcomes achieved.

Practising and prospective teachers' attitudes toward the use of technology in music education have also been widely researched (Atabek and Burak, 2019; Barry, 2004; Çevik Kılıç, 2015; Güdek, 2019; Kurtaslan, 2013; Lehimler, 2016; Özdoğan, 2014; Waddel and Williamon, 2019; Wand et al., 2011), with varying findings. Barry (2004), Kurtaslan (2013), Waddel and Williamon (2019) found that their study sample had a positive attitude toward the use of technology in music teaching, whereas Atabek and Burak (2019) and Çevik Kılıç (2015) showed that there was not enough importance placed on technology, and the study samples had moderate attitudes toward technology.

The way of, and the setting for, teaching is of great importance for teachers, one of the basic elements of education. The development and progress of individuals, institutions, and in the long run the society, depends largely on teachers. The more teachers are willing to embrace, use, and encourage the adoption of innovations, the greater an effect this will have in expanding students' horizons and their ability to keep up with the requirements of our modern age. In line with this idea, Vatansever Bayraktar and Karabulut (2020) stated that teachers are the most fundamental factor in increasing the quality of education, and that there is a direct relationship between the mindsets and perspectives of teachers and their responses to innovations in the field of education. According to Zhu et al. (2013), innovative teaching is a must for all teachers if they are to meet the educational needs of new generations. According to today's understanding of education, teachers should take an approach in which they know each of their students, value and respect their opinions, take into consideration, and accept their learning differences rather than trying to raise them uniformly. This approach requires teachers to revise, diversify, renovate, and update their style, methods, and techniques of teaching according to the specific needs of our age. Hence, teachers need to keep up with ever-increasing technological advances, have necessary knowledge and means to use mass media, and integrate these into their lessons. To respond to the challenges posed by the rapidly changing globalized world, education must improve itself all the time, and to this end, educators, managers, and curriculum development experts need to update their methods to ensure that students can be successfully prepared for their social and work lives (Serdjukov, 2017).

How practising and prospective teachers perceive the aforementioned innovative approach has also attracted scientific attention. Several realms of education research have looked into individuals' perceptions of innovations in education, yet there is no previous work in the music literature on this issue. Studies in Turkey that aimed determine to what extent practising and prospective teachers are open to innovations are relatively recent (Akın Kösterelioğlu and Demir, 2014; Karakan, 2020; Kılıç, 2015; Kocasarac, 2018; Konokman, Yokuş and Yanpar Yelken, 2016; Korucu and Olpak, 2015; Özgür, 2013; Vatansever Bayraktar and Karabulut, 2020; Yenice and Alpak Tunç, 2019). Openness to innovation has also attracted the attention of researchers abroad (Könings et al., 2007; Lu et al., 2005; Mahat et al., 2012; Suharyati, 2017). These studies have come up with varying results. Lu et al. (2005) and Kocasarac (2018) found that the sample groups had high levels of openness to innovation, while Özgür (2013) and Yenice and Alpak Tunç's (2019) samples had lower levels of openness to innovation.

In terms of the sustainability and quality of education, in addition to being aware of technological developments, being able to adopt and integrate these innovations into lessons is necessary for the area of music teaching as well. Covering the whole range of various professional fields such as the teaching of instrument playing, of composing, and of music technologist, music teachers need to create a good teacher profile that has the knowledge and skills required in our age (Albuz, 2004). Based on this idea, music educators, especially those that work in institutions that train music teachers, should be role models for their students with a modern and innovative perspective as well as enough knowledge of innovations in technology relevant to their field.

In light of the information above, the present study aimed to determine the attitudes and level of openness to innovation of music academics who provided distance music education, especially during the Covid-19 pandemic, in higher education institutions of professional music education and to reveal whether these variables correlate. It is also hoped that multidisciplinary music research could benefit from the findings of this study.

1.1. The Research Problem

According to the findings stated above, the research question was determined as follows: Is there a significant relationship between the attitudes of academics who provide distance music education toward technology and their level of openness to innovation?

1.2. Purpose of Research

The aim of this research is to determine the relationship between the attitudes of academicians teaching music remotely toward technology and their level of openness to innovation, and to examine these attitudes and levels according to various variables. To this end, answers to the following questions were sought:

1. To what extent are academicians teaching music remotely open to innovation and what are their attitudes toward technology?
2. Is there a significant gender difference in the openness to innovation and attitudes toward technology of academicians teaching music remotely?
3. Do the level of openness to innovation and attitudes toward technology of academicians teaching music remotely differ significantly according to their level of education?
4. Is there a significant difference in the level of openness to innovation and attitudes toward technology of academicians teaching music remotely resulting from their fields of expertise?
5. Do the level of openness to innovation and attitudes toward technology of academicians teaching music remotely correlate significantly?

2. METHODOLOGY

The present study employed the quantitative research method of relational screening model. According to Creswell (2017: 13), quantitative screening models enable researchers to determine the tendencies, attitudes, or opinions of a given sample in a population quantitatively or numerically. Büyüköztürk et al. (2017: 191) define relational screening as one that examines the correlation between two or more variables without any interference in these variables.

2.1. Population and Sample

The population of the present study is composed of academicians working in the departments of music in conservatories, faculties of fine arts, and faculties of education in universities in Turkey in the educational year of 2020-2021. The study sample was selected through non-proportional element sampling method. In this method, also known as "basic random sampling", "simple sampling", or "unbiased sampling", each individual in the population has an equal chance to be included in the sample (Karasar, 2005: 113). As the inclusion of one individual in the sample does not have an effect on the inclusion possibility of other individuals, this method is said to be more effective in representing the population than other methods (Büyüköztürk et al., 2017: 88). As such, the study sample was composed of a total of 74 academicians working in the music departments of universities in various regions in Turkey (Bolu Abant İzzet Baysal University -18, Çankırı Karatekin University -2, Gazi University -5, Giresun University -4, Harran University-2, Konya Necmettin Erbakan University -15, Marmara University -5, Muğla Sıtkı Koçman University -10, Tokat Gaziosmanpaşa University -11, Zonguldak Bülent Ecevit University -2) in the academic year of 2020-2021.

Of the 74 academicians in the sample, 31 (41.9%) were female and 43 (58.1%) were male, with 21 (28.4%) academicians having bachelor's and master's degrees and 53 (71.6%) having completed their PhD. The academicians in the study sample came from different specializations in music, with 17 (23%) specializing in bowed string instruments, 17 (23%) in keyboard instruments, 13 (17.6%) in theory, 10 (13.5%) in string instruments, 9 (12.2%) in vocal training, and 8 (10.8%) in wind instruments. When it comes to work experience, 28 participants (37.8%) had 17-24 years of work experience, followed by 18 (24.3%), 15 (20.3%), 7 (9.5%), and 6 (8.1%) of participants having 25 to 32, 9 to 16, 1 to 8, and 33 or more years of work experience, respectively. The age distribution of the study sample was as follows: 28 participants (37.8%) aged between 41-48, 19 participants (25.7%) aged between 33-40, 13 participants (17.6%) aged between 49-56, 8 participants (10.8%) aged between 57-64, and 6 participants (8.1%) aged between 25 and 32. The greatest number of academicians were employed in faculties of education (58 participants, 78.4%), followed by 11 participants (14.9%) in conservatories, and 5 participants (6.8%) working in faculties of fine arts.

When it comes to the computer software used for teaching music remotely, Zoom was the most frequently used software with 21 academicians (28.4%), followed by Adobe Connect (18 participants, 24.3%), Microsoft Teams (12 participants, 16.2%), UZEM (8 participants, 10.9%), Google Meet (8 participants, 10.9%), BigBlueButton (5 participants, 6.8%), Perculus (4 participants, 5.4%), Skype (2 participants, 2.7%), WhatsApp (1 participant), and Bigmotion (1 participant). In addition, 12.1% of academicians stated that they used two different computer software in their classes, whereas 4% taught on three programmes.

2.2. Data Collection Tools

Following the review of the literature on the subject, a personal information form was prepared by the researcher to collect demographic information of the academicians in the sample, which included questions on gender, level of education, work experience, fields of expertise, age, name of institution, as well as questions on the software they used for distance education. Two different scales were used in the study. The first is the 'Innovative Teacher Characteristics Scale' developed by Kocasarac (2018) in order to determine the extent to which academicians teaching music are open to innovation, consisting of 53 items and 4 sub-dimensions, namely *a teacher that is open to innovation, a teacher that is open to information technologies, a teacher open to learning, and a teacher open to development and cooperation*. The scale was developed in the 2016-2017 academic year upon being applied to 384 teachers working in science and social sciences high schools in the province of Ankara. The cronbach alpha reliability coefficient of the scale was calculated to be 0,95. A scale is considered reliable if it has a reliability coefficient value of 0,70 or higher, which suggests that the aforementioned scale is reliable. The other scale used in the present study is the 'Attitude toward Technology Scale' developed by Akbaba Altun (2002) to determine the attitudes of academicians teaching music towards technology, consisting of 37 items and 9 sub-dimensions, namely *adopting technology, technology and development, keeping up with technology, technology and management, fear of technology, technology and internet, trust in technology, technology and pessimism, use of technology*. The scale was developed in 2000 upon being applied to 123 school managers in the province of Hatay, and its Cronbach Alpha reliability coefficient was calculated to be 0,91. The factors that played a role in the selection of these two data collection tools were their relatively more widespread use in previous research and easier access to their developers.

2.3. Data Analysis

The data gathered were analysed on SPSS package software. The descriptive statistical methods of arithmetic mean and standard deviation were used to determine the openness to innovation and attitudes toward technology of academicians teaching music remotely. To determine the hypothesis of normality, the analytical test values of Kolmogorov-Smirnov and Shapiro-Wilk statistics, and skewness-kurtosis coefficients for each data set were calculated, setting $N > 50$ and ± 1 as thresholds for the aforementioned normality tests, respectively (Büyüköztürk, 2006: 40-42). The normally distributed data sets were tested through t-test and ANOVA, whereas Mann Whitney U and Kruskal-Wallis tests were used for non-normally distributed data. The relationship between the characteristics of innovative teachers and attitudes toward technology was examined through Pearson Correlation analysis, where the correlation coefficient of 0.00-0.30 was interpreted as low correlation, followed by 0,30-0,70 (moderate), and 0,70-1,00 (high) (Büyüköztürk, 2006: 32). The significance threshold was set as $p < ,05$.

3. FINDINGS

3.1. Findings of Descriptive Statistics Regarding Academicians' Level of Openness to Innovation and Attitudes toward Technology

Table 1.

Findings of Descriptive Statistics Regarding the Characteristics of Innovative Teachers

| | N | Min | Max | \bar{X} | Sd |
|--|----|------|------|-----------|-----|
| Characteristics of innovative teachers | 74 | 3,21 | 5,00 | 4,38 | ,42 |
| Open to innovation | 74 | 3,69 | 5,00 | 4,58 | ,38 |
| Open to information technologies | 74 | 2,83 | 5,00 | 4,30 | ,53 |
| Open to learning | 74 | 2,17 | 5,00 | 4,19 | ,65 |
| Open to development and cooperation | 74 | 2,00 | 5,00 | 3,72 | ,67 |

Table 1 shows that the average score of the study sample in the 'Characteristics of Innovative Teachers Scale' is $\bar{X}=4,38$, which indicates that the participating academicians teaching music remotely have a 'quite high' level of openness to innovation, as an average score that is equal to or greater than 4,21 is said to indicate 'very high' concordance to the characteristics of innovative teachers. Similarly, the average scores obtained from the sub-dimensions of *a teacher that is open to innovation* ($\bar{X}=4,58$) and *a teacher that is open to information technologies* ($\bar{X}=4,30$) reveal that the study sample has a 'very high' level of concordance to the characteristics of innovative teachers. The averages of the sub-dimensions of *a teacher that is open to learning* ($\bar{X}=4,19$) and *a teacher that is open to development and collaboration* ($\bar{X}=3,72$) indicate a 'high' level of innovative teacher characteristics among the participants. The highest and the lowest average scores were in the sub-dimensions of *a teacher that is open to innovation* ($\bar{X}=4,58$) and *a teacher that is open to development and cooperation* ($\bar{X}=3,72$), respectively.

Table 2.

Findings of the Descriptive Statistics of the Attitudes Toward Technology Scores

| | N | Min | Max | \bar{X} | Sd |
|----------------------------|----|------|------|-----------|-----|
| Attitude toward technology | 74 | 1,73 | 4,84 | 3,86 | ,54 |

The average score of the study participants in the Attitudes Toward Technology Scale was $\bar{X}=3,86$, which reveals that they have a positive attitude toward technology.

3.2. Findings on Gender Differences in Openness to Innovation and Attitudes toward Technology of Academicians

Table 3.

T-Test and Mann-Whitney U Test Results for Characteristics of Innovative Teachers Scores by Gender

| | Gender | N | \bar{X} / \bar{X}_{rank} | t/U | P |
|--|--------|----|----------------------------|-------|------|
| Characteristics of innovative teachers | Female | 31 | 4,47 | 1,61 | ,11 |
| | Male | 43 | 4,31 | | |
| Open to innovation | Female | 31 | 4,67 | 1,74 | ,07 |
| | Male | 43 | 4,51 | | |
| Open to information technologies | Female | 31 | 39,76 | 596,5 | ,44 |
| | Male | 43 | 35,87 | | |
| Open to learning | Female | 31 | 4,27 | ,89 | ,38 |
| | Male | 43 | 4,13 | | |
| Open to development and cooperation | Female | 31 | 3,91 | 2,13 | ,04* |
| | Male | 43 | 3,58 | | |

* $p < .05$

While the average scores in the 'Characteristics of Innovative Teachers Scale' in general ($t=1,61$ $p > .05$) as well as those obtained from the sub dimensions of *a teacher that is open to innovation* ($t=1,74$ $p > .05$), *a teacher that is open to information technologies* ($u=596,5$ $p > .05$), and *a teacher that is open to learning* ($t=,89$ $p > .05$) did not significantly differ in terms of gender, there was a significant gender difference in the sub dimension of *a teacher that is open to development and cooperation* ($t=2,13$ $p < .05$). This indicates that female academicians have a greater average score than male academicians ($\bar{X}=3,91$ versus $\bar{X}=3,58$, respectively), and therefore they reflect the characteristics of a teacher that is open to development and cooperation more.

Table 4.

Mann-Whitney U Test Results of Attitude Scores Classified According to Gender

| | Gender | N | \bar{X} / \bar{X}_{rank} | U | P |
|----------------------------|--------|----|----------------------------|-------|-----|
| Attitude toward technology | Female | 31 | 38,66 | 630,5 | ,69 |
| | Male | 43 | 36,66 | | |

Table 4 shows the scores the academicians obtained from the 'Attitude Toward Technology Scale'. The results indicate that there is no significant gender difference in the attitudes toward technology of academicians teaching music remotely ($U=630,5$ $p > .05$). When the similarity in mean rank scores of female and male academicians is taken into account ($\bar{X}=38,66$ and $\bar{X}=36,66$, respectively), it can be concluded that both genders have a positive attitude toward technology

3.3. Findings of Analyses of Academicians' Level of Openness to Innovation and Attitudes toward Education in Terms of Their Levels of Education

Table 5.

T-Test and Mann-Whitney U Test Findings of Scores Obtained from the 'Characteristics of Innovative Teachers Scale' Categorized According to Level of Education

| | Degree | N | \bar{X} / \bar{X}_{rank} | t/U | P |
|--|----------------------------|----|----------------------------|-------|------|
| Characteristics of innovative teachers | Bachelor's/Master's degree | 21 | 4,33 | -,58 | ,56 |
| | PhD/Proficiency in art | 53 | 4,39 | | |
| Open to innovation | Bachelor's/Master's degree | 21 | 4,56 | -,28 | ,78 |
| | PhD/Proficiency in art | 53 | 4,59 | | |
| Open to information technologies | Bachelor's/Master's degree | 21 | 34,86 | 501 | ,50 |
| | PhD/Proficiency in art | 53 | 38,55 | | |
| Open to learning | Bachelor's/Master's degree | 21 | 4,23 | ,34 | ,74 |
| | PhD/Proficiency in art | 53 | 4,17 | | |
| Open to development and cooperation | Bachelor's/Master's degree | 21 | 3,44 | -2,39 | ,02* |
| | PhD/Proficiency in Art | 53 | 3,84 | | |

* $p < .05$

As shown in Table 5, the overall scores in the 'Characteristics of Innovative Teachers Scale' ($t=-,58$ $p > .05$) as well as those obtained from its sub-dimensions of *a teacher that is open to innovation* ($t=-,28$ $p > .05$), *a teacher that is open to information technologies* ($u=501$ $p > .05$), and *a teacher that is open to learning* ($t=-,34$ $p > .05$) indicate that there was no significant difference in the level of openness to innovation of academicians teaching music remotely resulting from their level of education, whereas

the difference among academicians with different levels of education in the sub-dimension of *a teacher that is open to development and cooperation* ($t=-2.39$ $p<.05$) was found to be significant, with academicians with a degree of Ph.D. or proficiency in art having a greater average score than those with bachelor's/master's degrees ($\bar{X}=3,84$ versus $\bar{X}=3,44$, respectively), which indicates that they reflect the characteristics of *a teacher that is open to development and cooperation* more than academicians with bachelor's/master's degrees.

Table 6.

T-Test Findings of the Scores of Attitudes Toward Technology Categorized According to Level of Education

| | Degree | N | \bar{X} | Df | T | P |
|----------------------------|----------------------------|----|-----------|----|------|-----|
| Attitude toward technology | Bachelor's/Master's degree | 21 | 3,84 | 72 | -,23 | ,82 |
| | PhD/Proficiency in art | 53 | 3,87 | | | |

Table 6 indicates that academicians did not significantly differ in their average scores in the 'Attitudes toward Technology Scale' ($t=-,23$ $p>.05$) in terms of their levels of education, with academicians with bachelor's/master's degrees and Ph.D./proficiency in art degrees having very similar levels of positive attitudes toward technology ($\bar{X}=3,84$ and $\bar{X}=3,87$, respectively).

3.4. Findings of Analyses of Academicians' Level of Openness to Innovation and Attitudes toward Education in Terms of Their Fields of Expertise

Table 7.

Kruskal-Wallis and ANOVA Test Findings of Scores Obtained from the 'Characteristics of Innovative Teachers Scale' Categorized According to Academicians' Fields of Expertise

| | Expertise | N | \bar{X} / \bar{X}_{rank} | Sd | F/ χ^2 | P |
|--|--------------------------|----|----------------------------|----|-------------|-----|
| Characteristics of innovative teachers | Bowed String Instruments | 17 | 4,31 | 5 | ,90 | ,48 |
| | Wind Instruments | 8 | 4,64 | | | |
| | Keyboard Instruments | 17 | 4,37 | | | |
| | String Instruments | 10 | 4,39 | | | |
| | Vocal Training | 9 | 4,41 | | | |
| | Music Theory | 13 | 4,26 | | | |
| | Bowed String Instruments | 17 | 35,76 | | | |
| Open to innovation | Wind Instruments | 8 | 53,19 | 5 | 5,34 | ,38 |
| | Keyboard Instruments | 17 | 36,29 | | | |
| | String Instruments | 10 | 35,85 | | | |
| | Vocal Training | 9 | 38,67 | | | |
| | Music Theory | 13 | 32,15 | | | |
| | Bowed String Instruments | 17 | 4,14 | | | |
| | Wind Instruments | 8 | 4,48 | | | |
| Open to information technologies | Keyboard Instruments | 17 | 4,39 | 5 | ,80 | ,56 |
| | String Instruments | 10 | 4,41 | | | |
| | Vocal Training | 9 | 4,33 | | | |
| | Music Theory | 13 | 4,18 | | | |
| | Bowed String Instruments | 17 | 34,53 | | | |
| | Wind Instruments | 8 | 45,63 | | | |
| | Keyboard Instruments | 17 | 38,82 | | | |
| Open to learning | String Instruments | 10 | 37,95 | 5 | 1,73 | ,88 |
| | Vocal Training | 9 | 35,17 | | | |
| | Music Theory | 13 | 35,92 | | | |
| | Bowed String Instruments | 17 | 3,65 | | | |
| | Wind Instruments | 8 | 4,02 | | | |
| | Keyboard Instruments | 17 | 3,76 | | | |
| | String Instruments | 10 | 3,45 | | | |
| Open to development and cooperation | Vocal Training | 9 | 4,09 | 5 | 1,50 | ,20 |
| | Music Theory | 13 | 3,54 | | | |

Table 7 shows academicians' overall scores in the 'Characteristics of Innovative Teachers Scale' [$F=,90$ $p>.05$] as well as in all of its sub-dimensions (*a teacher that is open to innovation* [$c^2(5)=5,34$ $p>.05$]; *a teacher that is open to information technologies* [$f=,80$ $p>.05$]; *a teacher that is open to learning* [$c^2(5)=1,73$ $p>.05$], and *a teacher that is open to development and cooperation* [$F=1,20$ $p>.05$]). These findings indicate that there is no significant difference in the level of openness to innovation of academicians teaching music remotely resulting from their fields of expertise.

Table 8.

ANOVA Test Findings of Attitude Scores Classified According to Academicians' Fields of Expertise

| | Expertise | N | \bar{X} | Sd | F | P |
|----------------------------|--------------------------|----|-----------|----|-----|-----|
| Attitude toward technology | Bowed String Instruments | 17 | 3,75 | | | |
| | Wind Instruments | 8 | 4,18 | | | |
| | Keyboard Instruments | 17 | 3,82 | 5 | ,99 | ,43 |
| | String Instruments | 10 | 4,00 | | | |
| | Vocal Training | 9 | 3,75 | | | |
| | Music Theory | 13 | 3,82 | | | |

As can be understood from the scores of academicians in the 'Attitudes toward Technology Scale' summarized in Table 8 fields of expertise did not result in a significant difference in academicians' attitudes toward technology [$F=,99$ $p>.05$].

3.5. Findings on the Relationship Between Academicians' Level of Openness to Innovation and Attitudes toward Technology

Table 9.

Pearson Correlation Analysis Results of the Scores in the 'Characteristics of Innovative Teachers' Scale and Attitudes Toward Technology

| | Attitude toward technology | | |
|--|----------------------------|------|-------|
| | R | P | r^2 |
| Characteristics of Innovative Teachers | ,713 | ,00* | ,51 |
| Open to innovation | ,668 | ,00* | ,45 |
| Open to information technologies | ,771 | ,00* | ,59 |
| Open to learning | ,667 | ,00* | ,44 |
| Open to development and cooperation | ,303 | ,01* | ,09 |

* $p<.05$

Table 9 shows that the academicians' overall scores in the Characteristics of Innovative Teachers Scale as well as all of its sub-dimensions and their scores in the Attitudes toward Technology Scale are significantly correlated in the same direction, with varying degrees of significance. Hence, it could be concluded that there is a significant positive correlation between these two variables ($r=,713$ $p<.05$).

When it comes to the correlation between the scores in the 'Attitudes Toward Technology Scale' and the sub-dimensions of the 'Characteristics of Innovative Teachers Scale', it was found that academicians' scores in the Attitudes Toward Technology Scale were highly and positively correlated with the scores in the sub-dimension of *a teacher that is open to information technologies* ($r=,771$ $p<.05$), whereas they were moderately positively correlated with the sub-dimensions of *a teacher that is open to innovation* ($r=,668$ $p<.05$), *a teacher that is open to learning* ($r=,667$ $p<.05$), and *a teacher that is open to development and cooperation* ($r=,303$ $p<.05$). Based on these findings, it could be said that personality traits that reflect openness to innovation and attitudes toward technology influence each other, and that teachers with a high level of openness to innovation have positive attitudes toward technology, with vice versa being true as well.

When determination coefficients ($r^2=0,51$ - $r^2=0,45$ - $r^2=0,59$ - $r^2=0,44$ - $r^2=0,09$) are taken into account, it could be concluded that the variability in the attitudes toward technology results from the characteristics of an innovative teacher, *a teacher that is open to innovation*, *a teacher that is open to information technologies*, *a teacher that is open to learning*, and *a teacher that is open to development and cooperation* at the rates of 51%, 45%, 59%, 44%, and 9%, respectively.

4. RESULTS, DISCUSSION AND RECOMMENDATIONS

The findings of the present study indicate that academicians who teach music remotely have a very high level of openness to innovation. This is in line with previous research on the subject on samples outside of music (Kocasaraç, 2018; Korucu and Olpak, 2015; Lu et al., 2005). This similarity in findings may be associated with the age distribution in Lu et al.'s (2005) research and the fact that it was conducted on academicians, and with the sample composed of teachers in the case of Kocasaraç's (2018) study. Differences in study samples may be the reason for the lower levels of openness to innovation reported in other studies; for instance, the research samples were composed of prospective teachers in Özgür's (2013) and Yenice and Alpak Tunç (2019) studies. In contrast to practising teachers who feel obliged to adopt innovative traits as part of their teacher roles, prospective teachers may not have such a responsibility yet, hence accounting for the observed differences.

Another important finding of the present study was that academicians teaching music remotely have positive attitudes toward technology, which is in line with previous research in the realm of music education that examined the attitudes of prospective music teachers (Barry, 2004; Kurtaslan, 2013; Lehmler, 2016) and university students in the departments of music, musicians, and music teachers (Waddel and Williamon, 2019) toward technology. The similarity between the findings of the present study and those conducted on prospective music teachers, practising music teachers, students at the departments of music, and

musicians that have different demographic features may be that technology provides several advantages in musical activities as well as in the process of teaching music to people interested or engaged in music as a profession, which may facilitate the adoption of technology by these people and the formation of positive attitudes toward technology. On the other hand, there have been some studies reporting that prospective music teachers place little importance on technology (Atabek and Burak, 2019), and that they have moderate level attitudes toward technology (Çevik Kılıç, 2015).

The present study, which examined the attitudes of academicians toward technology and found their attitudes to be positive, is in conformity with various studies in other disciplines (Deniz et al., 2006; Erten, 2019; Kahraman, 2013). In spite of the demographic differences between the sample groups of the aforementioned studies and this study, the similarity in the findings could be attributed to the fact that, with the increasingly digitized world, technology has been integrated into every aspect of our lives and been adopted by everyone.

Based on the overall scores in the 'Characteristics of Innovative Teachers Scale' as well as the scores in three of its sub-dimensions (*a teacher that is open to innovation, a teacher that is open to information technologies, and a teacher that is open to learning*), it was concluded that gender did not have a significant effect in the levels of openness to innovation of academicians teaching music remotely. This is in line with various other studies in the relevant literature (Kılıç, 2015; Kocasarac, 2018; Vatansever Bayraktar and Karabulut, 2020), which may be due to the fact that all of these studies were conducted in approximately the same period of time and the study samples were composed of educators. In addition, it could be said that educators embrace innovations in the modern world, regardless of their gender. On the other hand, there was a significant gender difference only in the sub-dimension of *a teacher that is open to development and cooperation*, with female academicians scoring higher than males.

The study also showed that academicians' attitudes toward technology did not differ according to gender. There are several studies in the relevant literature that support this finding, reporting that there was no significant gender difference in prospective music teachers' attitudes toward technology (Atabek and Burak, 2019; Çevik Kılıç, 2015; Kurtaslan, 2013; Lehimler, 2016). This positive attitude toward technology regardless of gender could again be attributed to the conveniences for teachers and prospective teachers in educational settings provided by technology in the realm of music education, as is the case with all other aspects of modern life. Several studies conducted in other fields have come up with similar results (Deniz et al., 2006; Erten, 2019).

In contrast, there are also studies reporting significant gender difference in the attitudes of practising and prospective teachers toward technology, both in the realm of music (Güdek, 2019) and in other fields (Kahraman, 2013, Karakan, 2020; Suzek Birkollu et al., 2017). The common aspect of the aforementioned studies is that they all report that male teachers had more positive attitudes toward technology. Unlike pre-Covid-19 times, when teachers were not required to use technology in class, the necessity for online education during the pandemic led educators to use technology effectively regardless of their gender, which may explain why there was no gender difference in academicians' attitudes toward technology in the present study. The inconsistency between the findings of the present study and other studies that reported that males had more positive attitudes toward technology (Kahraman, 2013; Karakan, 2020; Suzek Birkollu et al., 2017) may be due to the fact that these studies were carried out prior to the pandemic.

Academicians' overall scores in the Characteristics of Innovative Teachers Scale and those obtained from three of its sub-dimensions (*a teacher that is open to innovation, a teacher that is open to information technologies, and a teacher that is open to learning*) indicate that academicians teaching music remotely do not differ in their levels of openness to innovation in terms of their level of education. While this finding is similar to the results of the work of Kahraman (2013), Kılıç (2015), Kocasarac (2018) and Vatansever Bayraktar and Karabulut (2012), it is different from Karakan's (2020) study which investigated prospective and practising preschool teachers' levels of openness to innovation and found that teachers with a master's degree were more open to innovation. The scores in the sub dimension of *a teacher that is open to development and cooperation* of the same scale, on the other hand, revealed a significant difference in the level of openness to innovation associated with the level of education, with academicians with PhD/proficiency in art degrees being more open to innovation. The similarity in the scores in the sub-dimension of *a teacher that is open to development and cooperation* between the present study and Karakan's (2020) research could reveal that the level of openness to innovation may increase with higher levels of education.

According to the results obtained from the 'Attitudes toward Technology Scale' used in the study, the attitudes of academicians teaching music remotely toward technology do not differ significantly depending on their levels of education, which is in line with previous findings in the relevant literature (Kahraman, 2013; Karakan, 2020).

Academicians' overall scores in the Characteristics of Innovative Teachers Scale and in all of its sub-dimensions (*a teacher that is open to innovation, a teacher that is open to information technologies, a teacher that is open to learning, and a teacher that is open to development and cooperation*) show that academicians' fields of expertise does have a significant effect on their levels of openness to innovation. While there has previously been research into educators' levels of openness to innovation, it compared professionals from different fields of study (teachers of Turkish language, Maths, Science, etc.) as opposed to the present study that looked into the possible differences between the sub-branches of music education (instrument training, voice training, music theory, etc.). For instance, in one study that examined the levels of openness to innovation of primary school teachers

from different branches, Kılıç (2015) showed that the teacher's fields of specialization did not significantly influence their levels of openness to innovation. In contrast, Kocasağ's (2018) PhD dissertation showed that teachers of English were significantly more open to innovation than teachers of other subjects.

The scores in the Attitudes toward Technology Scale indicate that there is no significant difference resulting from the fields of expertise of academicians teaching music remotely in their attitudes toward technology, which is in line with Özdoğan's (2014) study on the attitudes of academicians working in the departments of music at universities toward computer-assisted education. Attitudes toward technology have also been examined in other disciplines, with interdisciplinary studies seeking to determine if teachers from various fields of study differ in this matter. Suzek Birkollu et al. (2017) examined the attitudes of prospective teachers from different branches toward technology and found that attitude scores differed significantly according to the field variable, with prospective IT and music teachers perceiving technology more positively than prospective psychological guidance and counselling teachers.

The present study found a high positive correlation between academicians' levels of openness to innovation and their attitudes toward technology. This is in line with Karakan's (2020) Master's thesis and Köroğlu's (2014) study, both of which looked into the correlation between the levels of openness to innovation and attitudes toward technology, on samples composed of special education teachers working with autistic individuals and prospective and practising preschool teachers, respectively.

Modern age requires individuals to try to use and keep up with the developments in the web-based communication technologies, which are being used at an even larger scale. Because being able to keep up with, accept, and adopt technological developments depends on how open individuals are to innovations and change, attitudes toward technology and openness to innovation are two interrelated factors, as shown by the findings of the present study.

In our constantly changing, developing world, it is crucial to be open to innovation and technological developments for academicians who train future teachers, both in terms of the quality of education and being able to appeal more to future generations. Starting in late 2019, the Covid-19 pandemic has had an impact on the society as a whole, but its effects on the field of education were particularly important. As a result, everyone involved in the process of education found themselves engulfed in distance teaching, and online meetings and seminars. Given the uncertainty of the course of the epidemic, as well as the conspiracy theories put forward such as the *new world order*, the existing systems used in the process of education may now be replaced with greater digitalization and technology such that new methods and processes may become permanent and integral aspects of education, not just during the epidemic or for supporting conventional educational methods. Furthermore, it could also be foreseen that distance education technologies and digitization could become more popular research topics and be studied more extensively.

In light of the aforementioned predictions, the findings of the present study into the level of openness to innovation of academicians teaching music remotely and their attitudes toward technology, and other reports in the relevant literature, the following recommendations could be made for future research:

- The studies on music educators' perceptions on technology and innovation obtained during the pandemic, when online education systems were extensively used, could be replicated once face-to-face education resumes after the pandemic, and the findings in these two different periods could be compared.
- Future research could be conducted on a much larger sample, thus making it more comprehensive.
- Perceptions of academicians specializing in different realms of art, such as painting, acting, music, etc. of technology and innovation could be comparatively analysed.
- The level of openness to innovation and attitudes toward technology of music educators at different institutions and levels could be comparatively examined.

Research and Publication Ethics Statement

The article was written considering the principles of research and publication ethics. For this research, from Bolu Abant İzzet Baysal University Ethics committee approval was obtained with the date of 24.12.2020 and number 2020/284.

Contribution Rates of Authors to the Article

This research is based on the master thesis of the first author supervised by the second author. The first author participated in the preparation of the literature, data gathering, data analysis, findings and discussion stages. The second author assisted the first writer comply any changes that need to be made to the thesis and provided recommendations.

Statement of Interest

The authors declare that there is no conflict of interest.

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