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Online Vocal Teaching: The Role of the Traditionally Trained Instructor and the Advantages Offered by the Digital Environment

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Abstract

The paper aimed to propose methods to optimize digital vocal teaching for traditionally trained instructors. The study was performed in the Shanghai Conservatory of Music, Beijing Normal University and East China Normal University. The study sample comprised 342 students. The research objectives were to conduct a SWOT analysis of using Skype in online vocal teaching, to offer an online course (Theory and Applications of Digital Learning in Music Studies), to improve digital competencies of traditionally trained instructors, and to evaluate the impact of digital technology on students' creative academic performance. The SWOT analysis showed that there are predominant strengths in online vocal teaching, and new opportunities can be used to improve learning. The analysis of weaknesses revealed that traditionally trained instructors need to improve their digital literacy. 87 % of traditionally trained instructors improved their digital competencies by the proposed course (Theory and Applications of Digital Learning in Music Studies). Students' academic performance did not differ ($p > .05$) in the research groups. The mean score was 77±3.68 and 82±3.30, respectively, but there was a tendency for the mean score to increase. An instructor's main goal is to make sure that a student maintains a smooth and an even sound in a single breath, without forcing sound during singing, which cannot always be monitored during an online class. The study results allow one to integrate innovative digital technologies into higher music education, without reducing the efficiency of training. Prospective

research might focus on digital technology implementation in vocal studies in existing educational institutions to re-engineer teaching technologies and measure their effectiveness.

Keywords: *digital tool; instructor; online learning; traditional training; vocal music.*

Introduction

Due to the COVID-19 pandemic, educational institutions, like many other sectors, have been forced to move to online format (Kamal, Zubanova, Isaeva, & Movchun, 2021). Both students and instructors are facing new learning requirements. Instructors around the world have begun to seek, explore, and simultaneously exploit new opportunities for online learning (Yu, 2021). It was particularly difficult for creative people, including musicians, to adapt to and accept the new environment. This is due to the following facts:

- there is no physical contact between an instructor's hand and a student's hand to correctly place a student's fingers;
- the sound quality is highly dependent on the quality of the Internet connection of both participants;
- an additional headset is also required for quality sound;
- there are no traditional recitals;
- there is a sound delay (Academy of Sound, 2021).

Online platforms, tools, apps, and software were used to ensure uninterrupted and effective learning. In 2020, G. Yang and L. Yang (China) (2020) studied artificial intelligence. They started to apply new models of vocal training using artificial intelligence – a MOOC, a mobile app, and WeChat. Such a breakthrough demolished the traditional classroom-based model of vocal training and reorganized the spatial and temporal aspects of vocal training. The WIFI-based intelligent PPT technology is also used for effective vocal training. This technology provides an innovative learning model with a new type of online vocal music course on Azure-PaaS platform and uses learning, communication, and assessment modules (Li, 2017). Virtual reality technology for music education for children with autism has demonstrated a progressive approach. It is the latest emerging technology that applies virtual reality bot (V2R). Such technology includes teaching different musical notes and musical compositions depending on the child's interaction level, accuracy, and skills in using virtual reality bots and virtual musical instruments (Shahab, Taheri, Mokhtari, Shariati, Heidari, Meghdari, & Alemi, 2021). Today, in European countries, teachers' digital competencies are strategic as well as multicultural (Kucheryavaya, Witkowska, Kalinovskaya, Seleznev, Zubanova, & Fedyakin, 2020). For example, in Serbia, there is the Strategy of Education Development, which emphasizes the importance of digital technologies for the education development (Novković Cvetković, Stošić, & Belousova, 2018). Social media such as Twitter also provide positive support for music communities (Macià

& García, 2017). They do not only help to create communities, but also allow them to interact proactively. International pop music community on Twitter is an example of such a hub (Malik, Heyman-Schrum, & Johri, 2019). Productive learning of Shubailan, a form of music folk-talk-singing, has been achieved with Muyu mobile app in an online flipped classroom (Ng, Ng, & Chu, 2021). YouTube videos are widely used for online learning and teaching of folk/traditional music. This content is already used for banjo, fiddle, guitar, and mandolin lessons (Kruse & Veblen, 2012). Traditional instruction (reading from sheet music) and playing by ear have also adapted to digital learning and allow for the preservation of accuracy and fluency in the online learning format (Apro & Siebenaler, 2017). To improve learning, video lectures are widely used. They are not only sufficiently studied and developed (screencast, slideshow, chalk and talk, talking head, and on-location film), but also well remembered by students (Santos Espino, Guerra Artal, & González Betancor, 2021).

The elements of creativity and creative thinking are very important in music lessons (Gao, 2021). To ensure proper behavior in the classroom, engage students and make their work more meaningful, the students' incentives to develop autonomous forms of motivation (facilitated by current digital opportunities) need to be improved (Werth & Williams, 2021). Current video conferencing platforms (Skype, Zoom, Facebook Messenger, Apple Facetime, Google Hangouts, WhatsApp and others) provide good quality videos and sound, maintain smooth motion, recording capability, adjustable tones and enable fast feedback (Yee, 2020).

Traditionally trained instructors experienced difficulties when switching to digital tools, facing the need to adapt thereto. Teaching in an online environment and using advanced teaching methods requires special skills. To be effective, an instructor (tutor) must use the VOCAL approach in his/her work. VOCAL is an acronym for Visible, Organized, Compassionate, Analytical and Leader. The instructors' ability to effectively introduce such performance parameters into the real-world contexts (i.e., being vocal) will contribute to a supportive, stimulating, meaningful, rigorous, and effective learning environment. Instructors using the VOCAL approach will enjoy a more productive learning environment, fewer management problems, and a more positive learning experience with their students (Savery, 2005).

It is essential for vocal music instructors to exploit networked technology and digital tools to a full extent. This will contribute to quick improvements in traditional teaching models, enhancing interest, learning efficiency, and allowing for development of vocal talents.

Therefore, this paper was intended to propose methods to optimize digital vocal teaching for traditionally trained instructors.

Literature review

The productive and interesting study of music implies a combination of traditional teaching approaches and the opportunities offered by digital technology, where the instructor and his/her adaptability play a significant role.

Research studies by G. Yang and L. Yang (2020) from South-central University for Nationalities, China, highlighted aspects of applying artificial intelligence technology in vocal training. The researchers showed the unique advantages of the technology, the existing problems of the new model of vocal music teaching and proposed appropriate solutions. In a study conducted at University of Science and Technology Liaoning, Anshan, Liaoning (China), Li (2017) studied digital vocal training tools relying on the WIFI-based intelligent PPT technology. Such technology was used by 47.7 % of students for online vocal music courses, and 27.3 % of students accessed this platform very often, for learning purposes. This suggests a high learning effect of the implemented digital tools, which could serve as the basis for vocal music network design in university teaching.

The study of virtual reality technology was conducted by Shahab et al. (2021) at Social & Cognitive Robotics Laboratory, Center of Excellence in Design, Robotics, and Automation (CEDRA), Sharif University of Technology, Tehran, Iran. This technology helps to improve social skills through real-world simulations. This study analyzed the feasibility of virtual music education programs. Since this approach does not require purchasing a bot, it may be applied on a larger scale and at a lower financial cost. The study lasted 20 weeks and showed that the use of virtual reality bots and virtual musical instruments improved students' cognitive skills and academic performance. A general tendency towards an increase in musical ability has also been observed.

Engaging students in music creation using musical instruments in an interactive classroom has been studied by Ng et al. (2021), at the University of Hong Kong, China. A study conducted with Muyu mobile app focused on the musical folk singing of Shubailan in an online flipped classroom. This study involved mixed-method research with the use of a learning satisfaction survey, instructors' observations, and semi-structured interviews. It has been shown that such a strategy can effectively motivate students to learn music and improve their musical knowledge in Shubailan.

Kruse (University of North Texas, USA) and Veblen (University of Western Ontario, Canada) studied music teaching and online learning using YouTube instructional videos. Typical YouTube videos from five websites were analyzed for pedagogical and musical content. A selection of video lessons on banjo, fiddle, guitar, and mandolin was made. The results showed that most of the selected videos included various forms of hearing enhancement, simulations, technique-based instruction, and physiological cues. However, opportunities for improvisation were rare (Kruse & Veblen, 2012).

A study on well-being and creativity during Chinese folk music lessons was conducted by Gao (2021) from the School of Music and Dance, Hechi University, China. The analysis showed that approximately 59 % of the children felt good during the Chinese folk music lessons, 33 % felt excellent and 3 % felt bad. The results of Torrance Tests of Creative Thinking and Feeling during Chinese Folk Music Lessons showed a positive correlation. It has been proven that the percentage of children with high levels of creativity exceeds 20 %.

Savery (2005) from the University of Akron (USA) demonstrated an original approach to teaching. VOCAL (Visible, Organized, Compassionate, Analytical, Leader) technology was studied. The following specific strategies that an instructor can use in a digital learning environment have been discussed:

1) Awareness – the need to share information freely and easily with students, both formally on the website and informally in topic discussions;

2) Keeping promises – if an instructor commits to do something, he or she must do it on time;

3) WRITE THIS WAY modeling to communicate in an online environment – a need to communicate quickly and effectively in an online classroom;

4) Use of public and private communication channels - an instructor must be visible to students and avoid dominating the conversation;

5) End-of-course planning and implementation – this is important to close the class, consolidate what has been learned, review some important points of the course, and recognize students' contributions to the success of the learning community. Being VOCAL is very important for an instructor (Savery, 2005).

Amid the pandemic, online learning is becoming an important element of education, which is especially true for online music learning. With online vocal training, the instructor and his or her adaptation to the cutting-edge digital technology play an indispensable role.

The research of online vocal training complements and delves into the previous research on this issue.

Theoretical framework

Scientific research offers an online course (*Theory and Applications of Digital Learning in Music Studies*) to improve the digital skills and competencies of traditionally trained teachers for the development of digital music education.

Educational services result in a specific structure of instructor-student relations. The instructor must unlock the students' creativity, which is especially important in vocal training. The instructor's willingness to adapt to existing requirements effectively and quickly, to become competitive and to meet the student's wishes are among important factors. State-of-the-art teaching methods imply the use of digital technology in vocal training as well.

Methodology

The importance of this study determined the choice of the topic - the role of a traditionally trained instructor in online vocal training.

The research problem was to indicate the difficulties of the online vocal teaching and the role of the traditionally trained instructor in the digital environment.

The paper aimed to analyze the impact of traditionally trained instructors on students' performance to optimize digital vocal teaching.

The research hypothesis is: using innovative digital technology, students' academic performance is similar to the academic performance of students that use traditional methods.

Research objectives:

(1) to conduct a SWOT analysis of using Skype in online vocal teaching;

(2) to offer an online course *Theory and Applications of Digital Learning in Music Studies* to improve digital competencies of traditionally trained instructors;

(3) to evaluate the impact of digital technology on students' creative academic performance.

The originality of the research is evidenced by:

- a proposed method to improve digital competencies for traditionally trained instructors;
- gaining an insight into the university students' performance trends in vocal studies in offline and online learning formats.

The possibilities offered by digital tools and technology in music teaching are very important, and they create an opportunity to combine the theory and skills. A sophisticated approach to vocal training involves the use of strong pedagogical skills and cutting-edge digital tools.

Research design and sample

The study was conducted at higher education institutions in China, where vocal studies take place: Shanghai Conservatory of Music, Beijing Normal University and East China Normal University. The authors jointly proposed and developed the methodology and design of this study. The study sample consisted of 342 Bachelor Program students of the musicology departments of these universities, where they were surveyed in their 1st year of study (2019, 1st research phase) and 3rd year of study (the same students, 2021, 2nd research phase). 59 % of the respondents were males, while 41 % were females, with the average age of 17.78 ± 1.25 and 19.11 ± 1.78, respectively.

Research explanations

In case of traditional offline vocal training (2019), classes were held on the premises of music universities. The classes included:

- chanting;
- exercises to develop articulation and clear, expressive diction;
- breathing exercises to strengthen and support the breath while singing.

Skype features, which may be employed in online vocal learning, as well as the academic performance of students in offline and online formats were determined. Skype was chosen because it is state-of-the-art software with voice and free video calling features, available on any device (mobile phone, computer, tablet) with over 100 million users

(CNews, 2021). The study included a SWOT analysis and highlighted the Strengths, Weaknesses, Opportunities and Threats posed by Skype in online vocal training.

This research has 2 phases (before and during COVID-19). The sample population was divided into 2 groups (phases):

- Group 1 - first-year students attending vocal classes delivered using traditional teaching methods (offline), without digital technology;
- Group 2 - third-year students attending vocal classes using cutting-edge digital technology (Skype).

The purpose of selecting two groups was to compare students' academic performance in vocal studies.

Success was assessed using a 100-point grading system in both research groups. A score of 90-100 was given in case of:

- full and in-depth demonstration of the course content;
- awareness of the concepts and proficiency in terminology;
- consistent and logical presentation of the music theory and practical exercises;
- illustrating theoretical statements with relevant examples;
- strong knowledge, skills and abilities in the course of study;
- two or three inaccuracies that do not affect the correctness of the answer.
- A score of 70-89 was given in case of:
- sufficiently full demonstration of the course content;
- understanding of the meaning of most special terms;
- absence of significant errors in the presentation of the music theory and practical exercises;
- illustrating theoretical statements with relevant examples;
- sufficiently strong knowledge, skills and abilities in the course of study;
- two or three inaccuracies in the rationale provided for theoretical statements.
- A score of 60-69 was given in case of:
- inaccurate demonstration of the course content;
- incomplete understanding of the meaning of special terms;
- significant errors in the presentation of the music theory and performance;
- insufficient illustration of theoretical statements with relevant examples;
- satisfactory knowledge, skills, and abilities during study.
- A score of 35-59 was given in case of:
- inaccurate demonstration of the course content;
- failure to understand the meaning of special terms;
- material errors in the presentation of the course content;
- failure to apply the basic knowledge of the music theory and performance when answering a question;
- insufficient illustration of theoretical statements with relevant examples;
- satisfactory knowledge, skills, and abilities during study.

A student receiving 35-59 points failed the test. The results included final grades for the discipline.

After studying the course *Theory and Applications of Digital Learning in Music Studies*, teachers with traditional education answered how their level of knowledge in digital literacy has changed.

Course abstract

An online course *Theory and Applications of Digital Learning in Music Studies* was offered to improve digital competencies of traditionally trained instructors. The course was designed by researchers from the School of Computer Science and Software Engineering at East China Normal University and lasted 12 weeks. The course structure (total 150 hours) consisted of:

- 30 hours of lectures (L);
- 60 hours of practical exercises (PE);
- 70 hours of independent study (IS);
- 5 ECTS credits;
- classroom hours - 60 %;
- independent study - 40 %.

The program of the discipline is structured into 1 module, which includes 4 sections:

- online search for relevant information;
- Microsoft Office 365 basics and its features (Word, Excel, PowerPoint, OneNote, Microsoft Teams and additional tools);
- video mode and online visualization tools;
- psychological techniques used in an online environment.

The following topics were covered in the *Theory and Applications of Digital Learning in Music Studies* online course for traditional vocal teachers:

- requirements and interfaces of digital tools;
- effective techniques for online music learning;
- video mode and its features;
- online visualization tools, interactive infographics and visual design;
- development of multimedia content and presentation requirements;
- state-of-the-art psychological techniques used in an online environment.
- The lectures detailed and suggested:
- algorithms for developing individual skills for working in a digital environment;
- algorithms for creating practical music exercises with examples;
- data visualization algorithms (charts, graphs, schemes, text visualizations using ChartBlocks, Datawrapper, Plotly, RAW, Visual.ly, and Google Charts);
- algorithms for creating multimedia content using Photoshop, Piktochart, Sound Slides, and Prezi.

During the practical exercises, each instructor developed (initially with the help of a tutor, and then independently) the necessary content for music classes. Instructors

also got an insight into technologies contributing to development of musical skills - business games, briefings, conferences, discussions, dialogues, consultations, competitions, brainstorming, case studies, and training workshops. Such trend in the vocal training for the traditionally trained instructors allowed a quicker learning of the content and effective strengthening of the necessary skills by students (Table 1).

Table 1
Structure of the discipline Theory and Applications of Digital Learning in Music Studies

	Topics	Hours		
		L	PE	IS
1	Digital Learning in Music, basic concepts, classification, integration	2	3	4
2	Digital skills in Music	2	3	3
3	Web content in Music: creation, use, benefits, features	2	6	4
4	Creating a Presentation in PowerPoint	-	-	5
5	Work in Microsoft Excel	-	-	5
6	Cloud services: characteristics, creation, features	2	6	3
7	Musical Apps: description, examples, benefits, features	2	6	3
8	Online resources in modern Music: creation, use, benefits, features	2	6	3
9	Blogs: characteristics, benefits, using	2	6	3
10	Video conferencing in Music: description, examples, benefits, features	2	6	3
11	Online board: description, benefits, features	2	4	3
12	Graphic label: features, screen mode, example	2	3	3
13	Virtual reality in Music: characteristics, features	2	3	3
14	Augmented and mixed reality in Music: characteristics, features	-	-	5
15	Digital opportunities for team learning	2	2	3
16	Modern electronic music	-	-	5
17	Electronic music singers	-	-	5
18	Electronic documents in Music study	2	2	3
19	Identification of musical scientists, databases	2	2	3
20	Ecological online learning	2	2	3
Total		30	60	70

To study the course, instructors needed a smartphone, computer, or tablet with Internet access. This course was available 24/7. Lectures were delivered online, both in real time and recorded. Practical exercises took place in real time. This format of instructor training not only provided up-to-date knowledge, but was also convenient for instructors themselves. They were able to complete a new course without having to take a break from their full-time work. The course was intended to build on competencies necessary for a vocal coach to provide effective online learning of music and to develop the content for online classes. After completing the course, each instructor prepared a final individual creative project on independent development of practical exercises. The course effectiveness was measured by the percentage of independently developed creative projects (practical exercises) on a scale from the worst (0 %) to the best performance (100 %).

Ethical issues

The study was conducted in accordance with the International Code of Medical Ethics and the Declaration of Helsinki - Ethical Principles for Medical Research Involving Human Subjects. The respondents provided written informed consents to participate in the research, and complete anonymity of participants was ensured throughout the study.

Statistical data analysis

Statistical analysis of the data was performed using Microsoft Office Excel 2007. The data distribution was assessed using Student's t-test. Student's t-test was used to compare the means of average score in 2 research groups (phases). Based on the t-test results, it was concluded whether they were statistically different from each other. Quantitative data were determined on the basis of the mean value and standard error. Quantitative data were presented as M±SD, where M is the arithmetic mean and SD - standard deviation. Comparison results were considered at a statistical significance of .05.

Results

The vocal coach shapes and develops the students' singing skills, teaches them vocal techniques, voice training, and prepares them for performances and competitions.

Instructor-student interaction is important, especially in the digital world. When switching to online vocal training, the traditionally trained instructors began using the user-friendly and effective Skype. The study included a SWOT analysis and highlighted the Strengths, Weaknesses, Opportunities and Threats of Skype in online vocal training (Figure 1).

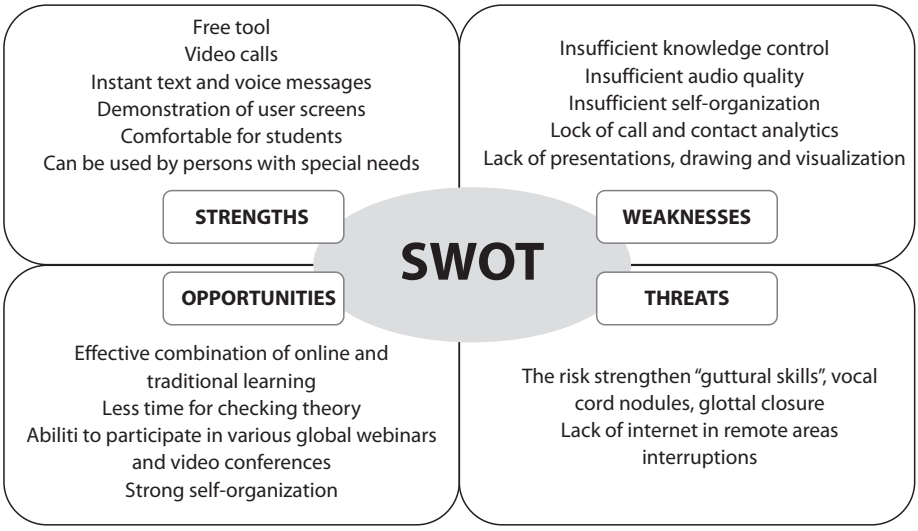

Figure 1. SWOT analysis of online vocal learning

The SWOT analysis showed that there are predominant strengths in online vocal teaching, and new opportunities can be used to improve learning. The analysis of weaknesses revealed that traditionally trained instructors have insufficient levels of digital knowledge and need to improve their digital knowledge and digital literacy.

Upon completion of the *Theory and Applications of Digital Learning in Music Studies* course, the traditionally trained instructors gained knowledge and learned to:

- understand the methodology of analyzing, evaluating and synthesizing digital information in music;
- search, process and analyze professionally important musical knowledge with the use of cutting-edge information technologies;
- create teaching and learning resources for singing lessons;
- understand digital teaching methods and technologies, and improve their own teaching methods;
- introduce information technology into learning and develop their own online courses;
- develop criteria, methods, and technologies for assessing learning outcomes.
- Theory and Applications of Digital Learning in Music Studies online course was described by:
- flexibility,
- cost-effectiveness,
- the new role of the traditionally trained instructor.

Upon completion of the *Theory and Applications of Digital Learning in Music Studies,* 87 % of traditionally trained instructors improved their digital competencies (in their opinion).

The students' performance in vocal learning was assessed (Table 2).

Table 2
Data on vocal music learning by university students

Research participants	Average score, points		
	2019 1st year, offline, traditional teaching methods	2021 3rd year, online, Skype use	p-value
Descriptive statistics	M±SD	M±SD	
Shanghai Conservatory of Music (115 participants)	72±2.15	78±2.87	.061*
Beijing Normal University (111 participants)	77±1.89	83±2.43	.054*
East China Normal University (116 participants)	81±3.37	86±3.03	.045**
Total	77±3.68	82±3.30	.058*

*p> *.05* is not *statistically significant*
**p< .05 is *statistically significant*

The study revealed the following: when comparing groups of students who studied vocal music using the traditional method and using Skype, the academic performance

did not differ (p> .05). The mean score was 77±3.68 and 82±3.30, respectively, but there was a tendency for the mean score to increase. The inequality of the groups in relation to the year did not affect the study results; the digital competencies of trained singing teachers influenced the students' achievements. As a result of this study, it was found that the academic achievement increased (a 6.49 % increase in the average score) after the course *Theory and Applications of Digital Learning in Music Studies.*

A comparison of online vocal learning with the traditional one gives all reasons to say that online vocal learning is possible. Implementation of these technologies in individual practical exercises of vocalists poses certain difficulties for the traditionally trained instructors who do not have sufficient level of IT literacy and competence for independent adjustment and work in digital environment using various IT tools, and who also experience difficulties with visualization. The instructor's main goal is to make sure that the student maintains a smooth, even breath sound, without forcing sound during singing, which can not always be monitored during an online class. In order to improve their own digital competencies and independent work in digital environment, traditionally trained instructors studied *Theory and Applications of Digital Learning in Music Studies* course.

Discussion

Teaching music online was researched by Johnson (2017a). The study results showed high bandwidth in the transmission and effective learning. The resulting digital model was successfully used in a formal case study involving 1,500 students.

Prospective uses of game-based learning resources in music education have been studied at Kaunas University of Technology, Lithuania. The data obtained during the experiment show a positive impact of such resources on the music learning. Instructors can use computer games as a supporting tool to immediately interact with students in formal music classes and for extracurricular informal learning (Raziūnaitė, Miliūnaitė, Maskeliūnas, Damaševičius, Sidekerskienė, & Narkevičienė, 2018).

The original study of the features of online vocal learning and teaching in music education institutions was conducted in Ukraine. The study investigated the advantages and disadvantages of digital technology-based teaching methods in professional vocal education. The authors show the feasibility of digital learning methods in music education, which is consistent with the present study results (Lanovenko-Melnyk, Basovska, Ostapchuk, Plakydyuk, & Khokhlan, 2020).

Synergy of technological and pedagogical solutions and the use of mobile Internet platforms and apps in vocal training were studied at the National Vocal Music Department, Shenyang Conservatory of Music, Shenyang, People's Republic of China. The study focused on the improvements and upgrades of music education aimed at developing fundamental vocal skills. The authors identified optimal technological solutions, which allow students to:

- acquire listening skills by playing music games by ear;
- sing along to recordings;
- listen to and identify chords, intervals, progressions, genres, etc.

Mobile apps such as VoCo Vocal Coach, Vocalist Lite, Vox Tools: Learn to Sing, Swiftscales Vocal Trainer, Singing Lessons, Pocket Pitch, Sound Cloud, Sing True, Voice Training, VocaLive CS were recommended for vocal training by Chinese scientists. This study also provided rationale for the synergy of technological solutions and state-of-the-art teaching styles in the development of vocal proficiency (Shi, 2021).

Research at the University of York, UK, shows the need for the investment that UK higher education institutions have already made in digital learning services. The results suggest the need to support educational institutions financially. The issue of study flexibility in the higher education system has also been discussed. Balanced development of services involves the use of digital tools (Walker, Jenkins, & Voce, 2018).

The study of the issues of online music education took place at Boston University (USA). The following challenges of implementing online learning for music instructors were discussed:

- coordination between distance education and music departments;
- management of adjunct music instructors;
- management of student behavior, and
- provision of student services, and others (Hebert, 2007).

Like in the present study, the authors offer solutions to these problems through online courses.

When researching music instructors' opinions about online music classes during the COVID-19 pandemic, ways to facilitate online classes were suggested. The study used a general screening model, and the survey was sent to the participants via e-mail. The study showed that the majority of music teachers in high schools considered online education unacceptable for music lessons. It was also found that the majority of participants:

- had no experience with online learning;
- experienced difficulties using the tools during the online lessons;
- had synchronization problems in all music activities;
- had Internet connection problems;
- had low motivation (on the part of students);
- found online lessons ineffective;
- experienced digital fatigue and other problems (Akarsu, 2021).

Teachers' digital literacy has been studied at the Universitas Ahmad Dahlan, Indonesia (2021). This research showed that teachers have digital problems: issues related to lack of technology, background, lack of time, limited budget, and low digital literacy. In the present study, such a problem was solved with the training program intended to improve the instructors' digital literacy (Pratolo & Solikhati, 2021).

An analysis of the challenges and opportunities music instructors face when they develop musical knowledge in an online learning format was conducted by Smaragda Chrysostomou and Angeliki Triantafyllaki, National and Kapodistrian University of Athens, Greece. Online alternatives for teaching and developing course content were explored to encourage students to rethink music teaching and online learning. The transition of music education to online format, the opportunities, and challenges of this learning form were discussed. The study showed that digital courseware offers great opportunities (15-minute online video with various options: traditional/technology-infused pedagogy, synchronous/asynchronous, classroom/video-recorded observation). Pedagogical problems such as insufficient technology knowledge and the issue of its synchronization were also considered (Chrysostomou & Triantafyllaki, 2020).

The development of music education technology in an online environment was studied by Carol Johnson, University of Melbourne, Australia. It has been shown that although digital technology is available, this does not mean that all instructors are ready for the pedagogical changes required to implement online learning. The transformation of existing pedagogical practices (that is, to online pedagogy) requires significant changes in pedagogical approaches and strategies for teaching music during the transition to online format. Researchers show that students support hybrid traditional and online learning models. It has also been shown that assistance to music instructors should be considered at the individual and institutional levels (Johnson, 2017a). The present study authors have also offered support to instructors at the institutional level.

Online learning of a basic musical instrument (piano) introduced in the system of mixed online/traditional training of music instructors in Ukraine has shown the positive academic results of the introduction of online courses in instrumental music (Havrilova, Ishutina, Zamorotska, & Kassim, 2019).

The prospects for ethnomusicology in modern classrooms were studied by researchers from Zhejiang Normal University, China. The possibility of using mobile online technology for teaching ethnomusicology was analyzed, and the impact of such technology on students' learning was assessed. 82.5 % of students are convinced that this technology should be part of a modern music course environment to improve technology integration (Annand & Jensen, 2017).

Assessing a Collaborative Online Environment for Music Composition was researched at Padova University, Italy. The study tested the effectiveness of the e-learning environment for music. Participants interacted online, using synchronous and asynchronous resources to develop a new piece of music. The results showed that the participants successfully completed the composition task in a virtual environment. Moreover, teamwork, the platform, face-to-face/online differences, and strengths/weaknesses were analyzed. Overall, participants demonstrated an understanding of the opportunities offered by online tools and the task at hand (Biasutti, 2015). As in the present study, the results showed that participants successfully mastered musical composition in a virtual environment, and the academic performance was positive.

The variety of music available on the Internet is growing exponentially (Johnson, 2017b). Since Groulx and Hernly's (2010) study, the availability of online master's degree programs in music education has increased by 277 %. Online music education is growing, which means that music instructors need to be aware of the current online trends, and they need to raise their awareness of the available programs (Johnson, 2017b). The present study also identified the need for improved awareness and digital competence.

The applications of SWOT analysis in digital learning were described by a team of scientists of the Republic of Belarus (2018). Scientists argue that digital education allows one to enhance population education (Bogatko, A. V., & Bogatko, M. P., 2018), which is similar to the present study results - digital competencies of education process participants account for achieving an increase in the average score of 6.49 %.

In view of the current requirements posed by science and learning, the instructor's role in online vocal training is very important and valuable. Most researchers from different countries are inclined to think about the possibility of using digital technology in vocal training. Not only is it vitally important, but also it will help develop modern, interesting, and creative content.

Research hypothesis was confirmed: using innovative digital technology, students' academic performance is similar to the academic performance of students that use traditional methods, but there is a tendency for it to increase in the group which uses digital learning.

Conclusions

A SWOT analysis of Skype use was conducted to examine online vocal training and analyze the academic performance in online vocal learning and teaching.

The SWOT analysis showed that there are predominant strengths in online vocal teaching, and new opportunities can be used to improve the learning. The analysis of weaknesses revealed that traditionally trained instructors need to improve their digital knowledge and digital literacy. In order to improve their digital competencies and independent work in digital environment, traditionally trained instructors took the *Theory and Applications of Digital Learning in Music Studies* course. 87 % of traditionally trained instructors improved their digital competencies after completing this course.

The study found that students' academic performance did not differ ($p > .05$) when comparing groups of students who studied vocal music using the traditional method and using Skype. However, academic performance can be increased by 6.49 % with increasing digital literacy of education process participants. To improve their digital competencies and independent work in digital environment, traditionally trained instructors studied *Theory and Applications of Digital Learning in Music Studies* course.

Comparing digital training with the traditional one, it can be clearly said that online vocal learning is feasible. Digital technology is essential in education. Yet, the application of these technologies in vocal exercises causes certain difficulties for the

traditionally trained instructors, as they bear greater responsibility for the students' vocal training. The instructor's main goal is to keep track of breathing patterns, and this cannot always be done online.

The study results allow one to integrate innovative digital technologies into higher music education, without reducing the efficiency of training.

Prospective research might focus on the implementation of digital technology in vocal studies in existing educational institutions to re-engineer teaching technologies and measure their effectiveness.

Ethics in publishing

This paper has not been published previously.

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Poučavanje vokalnih tehnika pjevanja u online obliku: uloga nastavnika s tradicionalnom izobrazbom i prednosti koje nudi digitalno okružje

Sažetak

Cilj je ovoga rada bio predložiti metode pomoću kojih bi nastavnici s tradicionalnom izobrazbom na najbolji mogući način u digitalnom okružju izvodili nastavu vokalnih tehnika pjevanja. Istraživanje je provedeno na Glazbenom konzervatoriju u Šangaju, Normalnom sveučilištu u Pekingu i Normalnom sveučilištu u istočnoj Kini. Uzorak ispitanika sastojao se od 342 studenta. Ciljevi istraživanja bili su provesti SWOT analizu o uporabi Skypea u poučavanju vokalnih tehnika pjevanja, provesti online tečaj (Teorija i primjena digitalnoga učenja na studiju glazbe), unaprijediti digitalne kompetencije nastavnika s tradicionalnom izobrazbom te procijeniti utjecaj digitalne tehnologije na kreativne akademske rezultate studenata. SWOT analiza pokazala je da postoje značajne snage u poučavanju vokalnih tehnika pjevanja, a nove prilike mogu se iskoristiti za unaprjeđenje procesa učenja. Analiza slabosti pokazala je da nastavnici s tradicionalnom izobrazbom trebaju unaprijediti svoju digitalnu pismenost. 87 % nastavnika s tradicionalnom izobrazbom unaprijedilo je svoje digitalne kompetencije pomoću predloženoga tečaja (Teorija i primjena digitalnoga učenja na studiju glazbe). Akademska postignuća studenata unutar dviju grupa nisu se razlikovala ($p > 0,05$). Srednja vrijednost iznosila je $77 \pm 3,68$ i $82 \pm 3,30$ za svaku grupu pojedinačno, ali uočena je tendencija porasta srednje vrijednosti. Glavni je cilj nastavnika voditi računa o tome da student proizvodi jednolik glas unutar jednoga daha, bez naprezanja tijekom pjevanja, što se ne može uvijek nadzirati tijekom online nastave. Istraživanje je pokazalo da se u nastavu glazbe na visokoškolskoj razini mogu uvesti inovativne digitalne tehnologije, a da se ne smanji učinkovitost nastave. Buduća bi se istraživanja mogla fokusirati na uvođenje digitalne tehnologije u studij vokalnih tehnika pjevanja u postojećim obrazovnim ustanovama kako bi se osuvremenile tehnike poučavanja te izmjerila njihova učinkovitost.

Ključne riječi: *digitalni alat; nastavnik; online učenje; tradicionalna izobrazba; vokalna glazba.*

Uvod

Zbog pandemije bolesti COVID-19 obrazovne su ustanove, kao i mnogi drugi sektori, bile prisiljene prijeći na *online* oblik rada (Kamal, Zubanova, Isaeva i Movchun, 2021). I studenti i nastavnici suočili su se s novim zahtjevima učenja. Nastavnici širom svijeta počeli su tražiti, analizirati i istovremeno koristiti nove mogućnosti *online* učenja (Yu, 2021). Kreativnim ljudima, uglavnom glazbenicima, bilo je jako teško prilagoditi se i prihvatiti novo okružje, zbog nekoliko razloga:

- nema fizičkoga kontakta između ruke nastavnika i studenta pomoću čega bi se prsti studenta postavili u ispravan položaj
- kvaliteta zvuka uvelike ovisi o kvaliteti internetske veze i nastavnika i studenta
- dodatni par slušalica također je potreban za kvalitetan zvuk
- nema tradicionalnih recitala
- u prijenosu zvuka postoji kašnjenje (Akademija za zvuk, 2021).

Koristile su se razne *online* platforme, alati, aplikacije i softver kako bi se osiguralo neprekinuto i uspješno učenje. G. Yang i L. Yang (2020) su 2020. godine u Kini proučavali umjetnu inteligenciju. Počeli su primjenjivati nove modele poučavanja vokalnih tehnika pjevanja pomoću umjetne inteligencije, koja je obuhvatila MOOC (masovni otvoreni online tečaj), mobilnu aplikaciju i WeChat. Takav napredak u nastavi ukinuo je tradicionalni, učionički model poučavanja vokalnih tehnika pjevanja i reorganizirao prostorne i vremenske aspekte vježbanja vokalnih tehnika.

Inteligentna WIFI PPT tehnologija također se koristi za uspješno poučavanje vokalnih tehnika pjevanja. Ona omogućava inovativan model učenja s novom vrstom *online* glazbenoga kolegija o vokalnim tehnikama na Azure-PaaS platformi i s modulima učenja, komunikacije i provjere znanja (Li, 2017). Tehnologija virtualne stvarnosti u nastavi glazbene kulture za djecu s autizmom također predstavlja napredan pristup. To je najnovija tehnologija koja primjenjuje *botove* za virtualnu stvarnost (V2R). Ona obuhvaća poučavanje o različitim notama i glazbenim kompozicijama, ovisno o razini interakcije pojedinoga djeteta, točnosti i vještini korištenja *botova* za virtualnu stvarnost i virtualne glazbene instrumente (Shahab, Taheri, Mokhtari, Shariati, Heidari, Meghdari i Alemi, 2021). Danas u europskim zemljama digitalne kompetencije nastavnika imaju stratešku i multikulturalnu važnost (Kucheryavaya, Witkowska, Kalinovskaya, Seleznev, Zubanova i Fedyakin, 2020). U Srbiji, na primjer, postoji Strategija razvoja odgoja i obrazovanja koja naglašava važnost digitalnih tehnologija u razvoju obrazovanja (Novković Cvetković, Stošić i Belousova, 2018). Društvene mreže poput Twittera također uvelike podržavaju glazbene zajednice (Macià i García, 2017). One ne samo da pomažu u stvaranju zajednica, nego omogućavaju proaktivnu interakciju u njima. Međunarodna zajednica za pop-glazbu na Twitteru jedan je takav primjer (Malik, Heyman-Schrum i Johri, 2019). Produktivan način učenja *Shubailana*, oblika narodnoga glazbenog izričaja koji se temelji na priči i pjevanju, ostvaren je pomoću Muyu mobilne aplikacije u *online* obliku obrnute učionice (Ng, Ng i Chu, 2021). Videozapisi s YouTubea

uvelike se koriste za učenje i poučavanje o narodnoj/tradicionalnoj glazbi u *online* nastavi. Takvi se sadržaji već koriste za sate sviranja bendža, gitare i mandoline (Kruse i Veblen, 2012). Tradicionalan oblik nastave (čitanje nota) i sviranje po sluhu također su se prilagodili digitalnom učenju i pomažu u očuvanju točnosti i tečnosti u *online* učenju (Apro i Siebenaler, 2017). Videolekcije također se koriste u unaprjeđenju procesa učenja. One ne samo da se dovoljno proučavaju i unaprjeđuju (u obliku snimljenih videozapisa ekrana, dijaprojekcija, objašnjenja pomoću ploče i krede, snimke osobe koja prezentira sadržaj te filma), nego ih studenti i jako dobro pamte (Santos Espino, Guerra Artal i González Betancor, 2021).

Elementi kreativnosti i kreativnoga razmišljanja jako su važni u nastavi glazbe (Gao, 2021). Kako bi se osiguralo primjereno ponašanje u učionici te kako bi se studenti maksimalno uključili u aktivnosti, a njihov rad učinio smislenijim, potrebno je potaknuti studente da razviju autonomne oblike motivacije (koje će dodatno potaknuti postojeće digitalne prilike) (Werth i Williams, 2021). Platforme koje se trenutačno koriste za održavanje videokonferencija (Skype, Zoom, Facebook Messenger, Apple Facetime, Google Hangouts, WhatsApp i druge) omogućavaju dobru kvalitetu videa i zvuka, ne prekidaju pokret, imaju dobre mogućnosti snimanja, ton se može prilagoditi, a omogućavaju i brzu povratnu informaciju (Yee, 2020).

Nastavnici s tradicionalnom izobrazbom naišli su na poteškoće prilikom prijelaza na digitalne alate jer su se morali njima prilagoditi. Poučavanje u *online* okružju i korištenje naprednih nastavnih metoda zahtijeva posebne vještine. Da bi bio učinkovit, nastavnik (tutor) mora koristiti tzv. VOCAL pristup u radu. Na engleskom jeziku VOCAL je kratica za: vidljiv, organiziran, suosjećajan, analitičan i vođa. Sposobnost nastavnika da uspješno uvede takve parametre izvedbe u stvarni kontekst (tj. da bude VOCAL) doprinijet će poticajnom, smislenom, striktnom i učinkovitom okružju za učenje. Nastavnici koji primjenjuju takav pristup uživat će u produktivnijem okružju za učenje, imat će manje problema u upravljanju grupom studenata te će ostvariti pozitivnije iskustvo učenja sa svojim studentima (Savery, 2005).

Neophodno je da nastavnici koji poučavaju vokalne tehnike pjevanja u potpunosti istraže postojeću tehnologiju i digitalne alate. To će pridonijeti brzim poboljšanjima tradicionalnih nastavnih modela, povećati interes i uspješnost učenja te pomoći razvoju talenta za vokalno pjevanje.

Stoga je namjera ovoga rada bila predložiti neke metode pomoću kojih se može uvelike unaprijediti način na koji nastavnici s tradicionalnom izobrazbom poučavaju vokalne tehnike pjevanja.

Pregled literature

Produktivno i zanimljivo studiranje glazbe podrazumijeva kombinaciju tradicionalnih nastavnih pristupa i mogućnosti koje nudi digitalna tehnologija, pri čemu je od posebne važnosti nastavnikova sposobnost prilagodbe.

Istraživanja koja su proveli G. Yang i L. Yang (2020) sa Središnjega južnog sveučilišta u Kini istaknula su neke aspekte primjene umjetne inteligencije u poučavanju

vokalnih tehnika pjevanja. Autori su pokazali jedinstvene prednosti takve tehnologije, postojeće probleme novoga modela poučavanja vokalnih tehnika pjevanja te predložili odgovarajuća rješenja. U istraživanju koje je provedeno na Sveučilištu za znanost i tehnologiju Liaoning, u Anshanu u Kini, Li (2017) je proučavao alate koji se koriste u poučavanju vokalnih tehnika pjevanja, a koji se oslanjaju na inteligentnu WIFI PPT tehnologiju. Tu tehnologiju u *online* kolegijima vokalnih tehnika pjevanja koristi 47,7 % studenata, a 27,3 % studenata često joj pristupa radi učenja. To upućuje na činjenicu da primijenjeni digitalni alati imaju veliki utjecaj na učenje, što bi moglo poslužiti kao temelj za izradu mreže za vokalnu glazbu na sveučilišnoj razini.

Istraživanje o tehnologiji virtualne stvarnosti proveli su Shahab i sur. (2021) u Laboratoriju za društvenu i kognitivnu robotiku Centra izvrsnosti za dizajn, robotiku i automatizaciju, na Sharif sveučilištu za tehnologiju, u Teheranu u Iranu. Ta tehnologija pomaže unaprijediti društvene vještine kroz simulacije situacija iz stvarnoga svijeta. U ovome je istraživanju analizirana ostvarivost virtualnih obrazovnih programa za nastavu glazbe. Kako taj pristup ne zahtijeva kupovinu *botova*, može imati široku primjenu uz mali financijski trošak. Istraživanje je trajalo 20 tjedana i pokazalo je da uporaba *botova* za virtualnu stvarnost i virtualne glazbene instrumente poboljšava kognitivne vještine i akademski uspjeh studenata. Uočena je i opća tendencija razvoja glazbenih sposobnosti.

Uključivanje studenata u stvaranje glazbe pomoću glazbenih instrumenata u interaktivnoj učionici bilo je predmet istraživanja koje su proveli Ng i sur. (2021) na Sveučilištu u Hong Kongu, u Kini. Istraživanje je provedeno pomoću Muyu mobilne aplikacije, a fokusirano je na narodni glazbeni izričaj, Shubailan, koji se uči u *online* obliku obrnute učionice. U tome je istraživanju primijenjena mješovita metoda, a korišteni su anketa o zadovoljstvu učenjem, opažanja nastavnika i polustrukturirani intervjui. Pokazalo se da takva strategija može uspješno motivirati studente za učenje o glazbi i širenje njihova glazbenoga znanja o Shubailanu.

Kruse (Sveučilište u Sjevernom Teksasu, SAD) i Veblen (Sveučilište u zapadnom Ontariju, Kanada) proučavali su poučavanje glazbe i *online* učenje pomoću edukativnih videozapisa na YouTubeu. Analiziran je pedagoški i glazbeni sadržaj takvih tipičnih videozapisa, s pet različitih mrežnih stranica. Napravljen je odabir videolekcija o sviranju bendža, violine, gitare i mandoline. Rezultati su pokazali da je većina odabranih videolekcija obuhvatila različite oblike poboljšanoga slušanja, simulacija, poučavanja o tehnici sviranja te fizioloških signala. Međutim, prilike za improvizaciju bile su rijetke (Kruse i Veblen, 2012).

Gao (2021) iz Škole za glazbu i ples Sveučilišta Hechi u Kini proveo je istraživanje o dobrobiti i kreativnosti tijekom nastave u kojoj se uči o kineskoj narodnoj glazbi. Analiza je pokazala da se otprilike 59 % djece osjeća dobro tijekom te nastave, 33 % ih se osjeća odlično, a 3 % loše. Rezultati Torranceova testa kreativnoga mišljenja i osjećanja tijekom nastave o kineskoj narodnoj glazbi pokazali su pozitivnu korelaciju. Dokazano je da je postotak djece s velikom razinom kreativnosti veći od 20 %.

Savery (2005), sa Sveučilišta u Akronu (SAD), demonstrirao je originalan pristup nastavi. Proučavao je tehnologiju za primjenu VOCAL (vidljiv, organiziran, suosjećajan, analitičan i vođa) pristupa, a analizirane su sljedeće specifične strategije koje nastavnik može koristiti u digitalnom okružju za učenje:

1) osviještenost – potreba da se slobodno i lagano dijele informacije sa studentima, kako službeno na mrežnoj stranici, tako i neslužbeno u raspravama o određenoj temi
2) održavanje obećanja – ako je nastavnik obećao da će nešto napraviti, to mora učiniti na vrijeme
3) model PIŠITE NA OVAJ NAČIN za komunikaciju u *online* okružju – odgovara na potrebu za brzom i učinkovitom komunikacijom u virtualnoj učionici
4) upotreba javnih i privatnih kanala za komunikaciju – nastavnik mora biti vidljiv studentima i izbjegavati situacije u kojima će dominirati u razgovoru
5) provedba kolegija i planiranje njegova završetka – ovo je jako bitno za završetak kolegija, kako bi se ustustavilo ono što je naučeno, ponovili bitni sadržaji te prepoznao doprinos studenata uspjehu zajednice za učenje. Za nastavnika je jako bitno da radi u skladu s VOCAL pristupom (Savery, 2005).

Usred pandemije, *online* učenje postaje važnim elementom obrazovanja, a to je posebno slučaj kod učenja glazbe u *online* obliku. Kod poučavanja vokalnih tehnika u *online* obliku, nastavnik i njegova prilagodba najnovijoj digitalnoj tehnologiji imaju neopisivo važnu ulogu.

Istraživanje o poučavanju vokalnih tehnika u *online* okružju nadopunjava i prožima ranija istraživanja o toj temi.

Teorijski okvir

U sklopu ovoga istraživanja proveden je *online* tečaj (*Teorija i primjena digitalnoga učenja na studiju glazbe*) kako bi se unaprijedile digitalne vještine i kompetencije nastavnika s tradicionalnom izobrazbom i unaprijedila nastave glazbe u kojoj se koriste digitalne tehnologije.

Obrazovne aktivnosti rezultiraju posebnom strukturom odnosa između nastavnika i studenata. Nastavnik mora potaknuti kreativnost studenata, što je posebno važno u poučavanju vokalnih tehnika. Spremnost nastavnika da se prilagodi postojećim zahtjevima učinkovito i brzo, da postane konkurentan i da udovolji željama studenata jako su važni čimbenici. Najnovije nastavne metode podrazumijevaju uporabu digitalne tehnologije i u poučavanju vokalnih tehnika.

Metodologija

Važnost ovoga istraživanja odredila je odabir teme - uloga nastavnika s tradicionalnom izobrazbom u poučavanju vokalnih tehnika u *online* obliku.

Problem postavljen u istraživanju bio je istaknuti poteškoće poučavanja vokalnih tehnika pjevanja u *online* obliku i ulogu nastavnika s tradicionalnom izobrazbom u digitalnom okružju.

Cilj je rada bio analizirati utjecaj nastavnika s tradicionalnom izobrazbom na uspjeh studenata i unaprijediti način poučavanja vokalnih tehnika u digitalnom obliku.

Hipoteza postavljena u ovome istraživanju jest: pomoću primjene inovativne digitalne tehnologije studenti ostvaruju sličan akademski uspjeh kao i studenti u čijoj se nastavi koriste tradicionalne metode.

Ciljevi istraživanja:

(1) provesti SWOT analizu o korištenju Skypea u poučavanju vokalnih tehnika u *online* obliku
(2) provesti online tečaj *Teorija i primjena digitalnoga učenja na studiju glazbe* kako bi se unaprijedile digitalne kompetencije nastavnika s tradicionalnom izobrazbom
(3) procijeniti utjecaj digitalne tehnologije na kreativni akademski uspjeh studenata.

Originalnost istraživanja može se potvrditi sljedećim:

- predloženom metodom unaprjeđenja digitalnih kompetencija nastavnika s tradicionalnom izobrazbom
- stjecanjem uvida u trendove u načinu izvedbe vokalnih tehnika kod studenata u *online* i u tradicionalnom obliku učenja.

Mogućnosti koje nude digitalni alati i tehnologija u nastavnom procesu jako su važni jer stvaraju mogućnosti za kombiniranje teorije i vještina. Sofisticirani pristup poučavanju vokalnih tehnika uključuje primjenu naprednih pedagoških vještina i najnovijih digitalnih alata.

Nacrt istraživanja i uzorak ispitanika

Istraživanje je provedeno na visokoškolskim ustanovama u Kini u kojima postoje studiji vokalnih tehnika: na Glazbenom konzervatoriju u Šangaju, Normalnom sveučilištu u Pekingu i Normalnom sveučilištu u istočnoj Kini. Autori su zajednički predložili i razradili metodologiju i nacrt ovoga istraživanja. Uzorak ispitanika sastojao se od 342 studenta prijediplomskoga studija na odsjecima za glazbu ovih sveučilišta. Ispitanici su anketirani tijekom prve godine studija (2019. godine, kada je provedena prva faza istraživanja) i tijekom treće godine studija (2021. godine, kada je provedena druga faza istraživanja s istim studentima). 59 % ispitanika bilo je muškoga, a 41 % ženskoga spola. Prosječna dob ispitanika kretala se u rasponu između 17,78 ± 1,25 i 19,11 ± 1,78, za svaku grupu pojedinačno.

Pojašnjenje istraživanja

U tradicionalnom obliku poučavanja vokalnih tehnika (2019) nastava se provodila u prostorima sveučilišta, a obuhvaćala je:

- napjeve
- vježbe za razvoj artikulacije i jasne, izražajne dikcije
- vježbe disanja za jačanje i održavanje daha prilikom pjevanja.

Utvrđene su karakteristike Skypea koje se mogu iskoristiti u učenju vokalnih tehnika u *online* obliku, kao i akademski uspjeh studenata u *online* i tradicionalnom obliku.

Skype je odabran zbog vrhunskoga softvera s glasovnim i besplatnim opcijama za videokonferencijske pozive, zbog toga što je dostupan na svim uređajima (mobitelima, računalima i tabletima) i zbog toga što ga koristi više od 100 milijuna korisnika (CNews, 2021). Istraživanje je uključilo SWOT analizu i naglasilo snage, slabosti, prilike i ograničenja koje donosi Skype u poučavanju vokalnih tehnika u *online* obliku.

Istraživanje je provedeno u dvije faze (prije i tijekom pandemije bolesti COVID-19). Uzorak ispitanika podijeljen je u dvije grupe (faze):

- Grupa 1 – sačinjavali su je studenti prve godine koji su pohađali nastavu vokalnih tehnika pjevanja koja se izvodila pomoću tradicionalnih nastavnih metoda (u offline obliku), bez digitalne tehnologije
- Grupa 2 – sačinjavali su je studenti treće godine koji su pohađali nastavu vokalnih tehnika pjevanja koja se izvodila pomoću najnaprednijih digitalnih tehnologija (Skype).

Dvije su grupe odabrane kako bi se mogao usporediti akademski uspjeh studenata u vokalnim tehnikama.

Uspjeh je u obje grupe utvrđen pomoću sustava ocjenjivanja od 100 bodova. Student je dobio između 90 i 100 bodova ako je:

- pokazao potpunu i detaljnu usvojenost sadržaja kolegija
- pokazao poznavanje pojmova i odlično usvojio terminologiju
- dosljedno i logično prezentirao glazbenu teoriju i izveo praktične zadatke
- ilustrirao teoriju pomoću odgovarajućih primjera
- pokazao čvrsto znanje, vještine i sposobnosti tijekom nastave
- napravio dvije ili tri pogreške koje ne utječu na točnost odgovora.
- Student je dobio između 70 i 89 bodova ako je:
- pokazao dovoljno opsežnu usvojenost sadržaja kolegija
- pokazao da razumije značenje većine posebnih termina
- nije napravio značajne pogreške u prezentaciji glazbene teorije i izvedbi praktičnih zadataka
- ilustrirao teoriju pomoću odgovarajućih primjera
- pokazao dovoljno čvrsto znanje, vještine i sposobnosti tijekom nastave
- napravio dvije ili tri pogreške pri objašnjavanju teorijskih zadataka.
- Student je dobio između 60 i 69 bodova ako:
- nije pokazao dovoljnu usvojenost sadržaja kolegija
- je pokazao nepotpuno razumijevanje značenja posebnih termina
- je napravio značajne pogreške u prezentaciji glazbene teorije i izvedbi
- nije dovoljno ilustrirao teoriju pomoću odgovarajućih primjera
- nije pokazao zadovoljavajuće razinu znanja, vještina i sposobnosti tijekom nastave.
- Student je dobio između 35 i 59 bodova ako:
- nije usvojio sadržaj kolegija

- nije pokazao razumijevanje značenja posebnih termina
- je napravio značajne pogreške u prezentaciji sadržaja kolegija
- nije primijenio osnovno znanje iz područja glazbene teorije i nije uspješno odgovorio na pitanja
- nije dovoljno ilustrirao teoriju pomoću odgovarajućih primjera
- nije pokazao zadovoljavajuće znanje, vještine i sposobnosti tijekom nastave.

Student koji je ocijenjen s brojem bodova između 35 i 59 nije položio test. Rezultati su obuhvatili i konačne ocjene za određenu disciplinu.

Nakon završetka tečaja *Teorija i primjena digitalnoga učenja na studiju glazbe* nastavnici s tradicionalnom izobrazbom odgovorili su na pitanje o tome koliko se njihovo znanje u području digitalne pismenosti promijenilo.

Sažetak tečaja

Online tečaj *Teorija i primjena digitalnoga učenja na studiju glazbe* organiziran je za nastavnike s tradicionalnom izobrazbom kako bi unaprijedili svoje digitalne kompetencije. Tečaj su osmislili istraživači s Fakulteta za računalne znanosti i softversko inženjerstvo Normalnog sveučilišta u istočnoj Kini. Tečaj je trajao 12 tjedana (150 sati), a imao je sljedeću strukturu:

- 30 sati predavanja
- 60 sati praktičnih vježbi
- 70 sati samostalnoga učenja
- 5 ECTS bodova
- sati provedeni u učionici – 60 %
- sati provedeni u samostalnom učenju – 40 %.
- Program specifične discipline organiziran je u sklopu jednoga modula, koji se sastoji od 4 dijela:
- pretraživanja relevantnih informacija *online*
- osnova i obilježja Microsoft Officea 365 (Word, Excel, PowerPoint, OneNote, Microsoft Teams i dodatni alati);
- video načina rada i alata za *online* vizualizaciju
- psiholoških tehnika koje se koriste u *online* okružju.

Sljedeće su teme obrađene u *Teoriji i primjeni digitalnoga učenja na studiju glazbe*, *online* tečaju za nastavnike vokalnih tehnika s tradicionalnom izobrazbom:

- zahtjevi i sučelja digitalnih alata
- učinkovite tehnike za učenje glazbe u online obliku
- video način rada i njegove karakteristike
- alati za online vizualizaciju, interaktivna infografika i vizualni dizajn
- razvoj multimedijskih sadržaja i uvjeti za prezentaciju
- najnovije psihološke tehnike koje se koriste u online okružju.
- U predavanjima su se detaljno obradile sljedeće teme:

- algoritmi za razvoj individualnih vještina za rad u digitalnom okružju
- algoritmi za izradu praktičnih glazbenih zadataka s primjerima
- algoritmi za vizualizaciju podataka (tablice, grafovi, shematski prikazi, vizualizacije teksta pomoću alata ChartBlocks Datawrapper, Plotly, RAW, Visual.ly i Google Charts)
- algoritmi za izradu multimedijskih sadržaja pomoću alata Photoshop, Piktochart, Sound Slides i Prezi.

Tijekom praktičnih vježbi, svaki je nastavnik izradio (prvo uz pomoć mentora, a kasnije samostalno) potrebni sadržaj za nastavu glazbe. Nastavnici su dobili uvid u tehnologije koje pomažu razvoju glazbenih vještina – poslovne igre, sastanci, konferencije, rasprave, dijalozi, konzultacije, natjecanja, *brainstorming*, studije slučaja i radionice. Takva edukacija nastavnika vokalnih tehnika s tradicionalnom izobrazbom omogućila je brže usvajanje sadržaja i učinkovit razvoj potrebnih vještina kod studenata (Tablica 1).

Tablica 1

Za sudjelovanje u tečaju nastavnici su trebali imati mobitel, računalo ili tablet s internetskom vezom. Tečaj je bio dostupan 24 sata, 7 dana u tjednu. Predavanja su se izvodila u *online* obliku, u stvarnom vremenu ili pomoću snimke. Praktične vježbe su se održavale u stvarnom vremenu. Ovakav oblik edukacije nastavnika ne samo da im je pružio suvremena znanja, nego im je bio i vrlo praktičan. Mogli su završiti tečaj a da nisu prekidali svakodnevni rad. Tečaj je bio zamišljen tako da im pomogne razviti kompetencije potrebne za uspješno izvođenje nastave glazbe u *online* okruženju i da im pomogne izraditi sadržaj za *online* nastavu. Nakon završetka tečaja, svaki je nastavnik samostalno pripremio završni kreativni projekt i samostalno izradio praktične zadatke. Učinkovitost tečaja izmjerena je pomoću postotka samostalno izrađenih kreativnih projekata (praktičnih zadataka) na skali od najgorega (0 %) do najboljega (100 %).

Etička pitanja

Istraživanje je provedeno u skladu s Međunarodnim kodeksom medicinske etike i Helsinškom deklaracijom - Etičkim standardima kod medicinskih istraživanja na ljudima. Ispitanici su potpisali suglasnost za sudjelovanje u istraživanju, a zajamčena im je potpuna anonimnost tijekom istraživanja.

Statistička analiza podataka

Statistička analiza podataka provedena je pomoću Microsoft Office Excela 2007. Distribucija podataka provjerena je t-testom za studente, a pomoću njega su uspoređene srednje vrijednosti prosječnoga rezultata u dvjema grupama (fazama). Na temelju rezultata t-testa izveden je zaključak o tome postoji li statistički značajna razlika između njih. Kvantitativni podatci određeni su na temelju srednje vrijednosti i standardne pogreške, a prikazani su kao M±SD, pri čemu M predstavlja aritmetičku sredinu, a SD standardnu devijaciju. Kod rezultata usporedbe razmatrana je statistička razlika od 0,05.

Rezultati

Nastavnik koji poučava vokalne tehnike oblikuje i razvija pjevačke vještine studenata, poučava ih vokalnim tehnikama, trenira njihov glas i priprema ih za nastupe i natjecanja.

Interakcija između nastavnika i studenta jako je važna, posebno u digitalnom svijetu. Kada su prešli na nastavu u *online* obliku, nastavnici s tradicionalnom izobrazbom počeli su koristiti Skype, čija je uporaba lagana i učinkovita. Istraživanje je uključilo i SWOT analizu i naglasilo snage, slabost, prilike i ograničenja korištenja Skypea u poučavanju vokalnih vještina u *online* obliku (Slika 1).

Slika 1.

SWOT analiza pokazala je da se u poučavanju vokalnih tehnika u *online* obliku mogu pronaći važne snage, a nove prilike se mogu iskoristiti za unaprjeđenje procesa učenja. Analiza slabosti pokazala je da nastavnici s tradicionalnom izobrazbom nemaju odgovarajuću razinu digitalnoga znanja i da trebaju razviti svoje digitalno znanje i digitalnu pismenost.

Nakon završetka tečaja *Teorija i primjena digitalnoga učenja na studiju glazbe*, nastavnici s tradicionalnom izobrazbom stekli su znanje i naučili:

- razumjeti metodologiju analiziranja, vrednovanja i sintetiziranja digitalnih informacija u glazbi
- tražiti, obraditi i analizirati profesionalno važno glazbeno znanje pomoću naprednih informacijskih tehnologija
- izraditi nastavne materijale za sate pjevanja
- razumjeti metode i tehnologije u nastavi koja se izvodi digitalno te unaprijediti vlastite metode poučavanja
- uvesti informacijsku tehnologiju u učenje i izraditi vlastiti online kolegij
- osmisliti kriterije, metode i tehnologije za procjenu ishoda učenja.
- Karakteristike online tečaja Teorija i primjena digitalnoga učenja na studiju glazbe su:
- fleksibilnost
- niski troškovi
- nova uloga nastavnika s tradicionalnom izobrazbom.

Nakon završetka tečaja *Teorija i primjena digitalnoga učenja na studiju glazbe* 87 % nastavnika s tradicionalnom izobrazbom unaprijedilo je svoje digitalne kompetencije (prema vlastitom mišljenju).

Procijenjena je uspješnost studenata u učenju vokalnih tehnika (Tablica 2).

Tablica 2

Istraživanje je pokazalo sljedeće: kada su se usporedile grupe studenata koji su učili vokalne tehnike pomoću tradicionalnih metoda i putem Skypea, nisu uočene razlike u njihovom akademskom uspjehu ($p > 0,05$). Srednji rezultat je bio $77 \pm 3,68$

i 82 ± 3,30 za svaku grupu pojedinačno, no postojala je tendencija rasta srednje vrijednosti. Nejednakost grupa s obzirom na godinu studija nije utjecala na rezultate istraživanja; digitalne kompetencije nastavnika pjevanja utjecale su na postignuća studenata. Rezultat istraživanja jest da su se akademska postignuća studenata popravila (porast od 6,49 % u prosječnom rezultat) nakon što su nastavnici završili tečaj *Teorija i primjena digitalnoga učenja na studiju glazbe*.

Usporedba *online* učenja vokalnih tehnika pjevanja i tradicionalnoga načina učenja istih upućuje na to da je učenje vokalnih tehnika u *online* obliku moguće. Upotreba tih tehnologija u individualnim praktičnim vježbama za vokaliste predstavlja određene poteškoće za nastavnike s tradicionalnom izobrazbom koji nemaju dovoljnu razinu informatičke pismenosti ni kompetencije za samostalnu prilagodbu i rad u digitalnom okružju uz pomoć različitih IKT alata te koji nailaze na poteškoće u vizualizaciji. Glavni je cilj nastavnika osigurati uvjete da student održava gladak, neisprekidan glas unutar jednoga izdaha, a da se ne napreže tijekom pjevanja, što se ne može uvijek kontrolirati tijekom *online* nastave. Kako bi unaprijedili vlastite digitalne kompetencije i samostalan rad u digitalnom okružju, nastavnici s tradicionalnom izobrazbom pohađali su tečaj *Teorija i primjena digitalnoga učenja na studiju glazbe*.

Rasprava

Johnsonovo (2017a) istraživanje o poučavanju glazbe u *online* obliku pokazalo je veliku količinu prenesenih podataka i vrlo učinkovito učenje. Digitalni model koji je nastao na temelju toga istraživanja uspješno se koristio u službenoj studiji slučaja u kojoj je sudjelovalo 1500 studenata.

Na Sveučilištu za tehnologiju u Kaunasu, u Litvi, proučavani su potencijali korisnici materijala za učenje s elementima igrifikacije. Podatci koji su ovim eksperimentom dobiveni pokazuju pozitivan utjecaj takvih materijala na učenje glazbe. Nastavnici mogu koristiti računalne igre kao pomoćni alat kako bi bili u neposrednoj interakciji sa studentima tijekom formalne nastave glazbene kulture, ali i u informalnoj nastavi u sklopu slobodnih aktivnosti (Raziūnaitė, Miliūnaitė, Maskeliūnas, Damaševičius, Sidekerskienė i Narkevičienė, 2018).

Originalno istraživanje o karakteristikama učenja i poučavanja vokalnih tehnika pjevanja u *online* obliku na visokoškolskim ustanovama za glazbu provedeno je u Ukrajini. U njemu su analizirane prednosti i nedostatci nastavnih metoda koje se temelje na primjeni digitalne tehnologije u obrazovanju u području vokalnih tehnika. Autori su pokazali mogućnost primjene digitalnih metoda učenja u glazbenom obrazovanju, što je u skladu i s rezultatima ovoga istraživanja (Lanovenko-Melnyk, Basovska, Ostapchuk, Plakydyuk i Khokhlan, 2020).

Sinergija tehnoloških i pedagoških rješenja i upotreba mobilnih internetskih platformi i aplikacija u poučavanju vokalnih tehnika pjevanja proučavane su na Nacionalnom odsjeku za vokalnu glazbu na Glazbenom konzervatoriju u Shenyangu, u Narodnoj Republici Kini. Istraživanje je bilo fokusirano na razvoj i modernizaciju glazbenoga

obrazovanja s ciljem razvoja osnovnih vokalnih vještina. Autori su izdvojili najbolja tehnološka rješenja koja studentima pomažu da:

- usvoje vještine slušanja svirajući glazbene igre po sluhu
- pjevaju uz snimke
- slušaju i prepoznaju akorde, intervale, progresiju, žanrove itd.

Znanstvenici u Kini preporučili su mobilne aplikacije kao što su VoCo Vocal Coach, Vocalist Lite, Vox Tools: Learn to Sing, Swiftscales Vocal Trainer, Singing Lessons, Pocket Pitch, Sound Cloud, Sing True, Voice Training i VocaLive CS. Istraživanje je također stvorilo podlogu za sinergiju tehnoloških rješenja i najnaprednijih stilova poučavanja u razvoju vokalnih vještina (Shi, 2021).

Istraživanje na Sveučilištu u Yorku, u Ujedinjenom Kraljevstvu, pokazuje potrebu za ulaganjem u digitalno učenje, što je već u napravljeno na visokoškolskim ustanovama u Ujedinjenom Kraljevstvu. Rezultati upućuju na potrebu da se obrazovnim ustanovama pruži financijska podrška. Također se raspravljalo o fleksibilnosti studija u sustavu visokoga obrazovanja. Uravnoteženi razvoj obrazovnih usluga uključuje i uporabu digitalnih alata (Walker, Jenkins i Voce, 2018).

Studija o izazovima glazbenog aobrazovanja koje se odvija u *online* obliku provedena je na Sveučilištu u Bostonu (SAD). Analizirani su sljedeći izazovi s kojima se nastavnici glazbe suočavaju tijekom provedbe *online* učenja:

- koordinacija između nastave na daljinu i glazbenih odsjeka
- raspored za nastavnike koji rade na fakultetu honorarno
- nadziranje ponašanja studenata te
- pružanje usluga studentima i sl. (Hebert, 2007).

Kao i ovome istraživanju, autori prethodno navedenoga istraživanja nude rješenja za te probleme kroz organizaciju *online* tečajeva.

Kao rezultat analize mišljenja nastavnika glazbe o *online* nastavi glazbene kulture tijekom pandemije bolesti COVID-19 predloženi su načini kako bi se ona mogla olakšati. U studiji je korišten općeniti *screening* model, a anketa je ispitanicima poslana putem e-maila. Studija je pokazala da većina nastavnika glazbe koji rade u srednjim školama smatra da je *online* nastava neprihvatljiva u nastavi glazbene kulture. Također se došlo do saznanja da većina sudionika:

- nema iskustva u online učenju
- nailazi na poteškoće u korištenju alata tijekom online nastave
- ima problema sa sinkronizacijom u svim glazbenim aktivnostima
- ima problema s internetskom vezom
- ima slabu motivaciju (odnosi se na učenike)
- smatra da je online nastava neučinkovita
- osjeća digitalni zamor i druge probleme (Akarsu, 2021).

Digitalna pismenost nastavnika bila je predmet istraživanja provedenoga na Sveučilištu Ahmad Dalan u Indoneziji (2021). Ono je pokazalo da nastavnici imaju poteškoće s

digitalnom komponentom, što je bilo povezano s nedostatkom tehnologije i znanja, manjkom vremena, ograničenim financijskim sredstvima i niskom razinom digitalne pismenosti. U našem je istraživanju taj problem riješen pomoću tečaja čija je svrha bila unaprijediti digitalnu pismenost nastavnika (Pratolo i Solikhati, 2021).

Smaragda Chrysostomou i Angeliki Triantafyllaki, s Nacionalnoga i kapodistrijskoga sveučilišta u Ateni, u Grčkoj, analizirali su izazove na koje nastavnici glazbe nailaze i mogućnosti koje im se pružaju kada unaprjeđuju glazbeno znanje u *online* obliku. Analizirane su *online* alternative za poučavanje i izradu sadržaja kolegija kako bi se studente potaknulo na drugačije razmišljanje o poučavanju i učenju glazbe u *online* obliku. Raspravljalo se o prebacivanju nastave glazbe u *online* okruženje, kao i o izazovima i prilikama ovakvoga oblika učenja. Istraživanje je pokazalo da digitalni sadržaj kolegija nudi odlične mogućnosti (petnaestominutni *online* video s različitim opcijama: tradicionalna i tehnološki potpomognuta pedagogija, sinkrono/asinkrono izvođenje nastave, promatranje nastave u učionici/snimljeno promatranje rada). Pedagoški problemi poput nedovoljnoga tehnološkog znanja i problem njegove sinkronizacije također su razmatrani (Chrysostomou i Triantafyllaki, 2020).

Razvoj tehnologije koja se može koristiti u nastavi glazbe u *online* okružaju proučavala je Carol Johnson sa Sveučilišta u Melbournu, u Australiji. Pokazalo se da, iako je digitalna tehnologija dostupna, to ne znači da su svi nastavnici spremni za pedagoške promjene koje su potrebne da bi se učenje provodilo u *online* obliku. Transformacija postojećih pedagoških praksi (u *online* pedagogiju) zahtijeva značajne promjene u pedagoškom pristupu i strategijama za poučavanje glazbe tijekom prelaska na *online* nastavu. Autori su pokazali da studenti podupiru hibridni model učenja, tj. onaj koji obuhvaća tradicionalne i *online* modele učenja. Također se pokazalo da bi se trebala organizirati pomoć za nastavnike glazbe na individualnoj razini i na razini institucije (Johnson, 2017a). U ovome istraživanju autori su također unutar institucije ponudili potporu nastavnicima.

Online način učenja sviranja glazbenih instrumenata (klavira) koji je uveden u sustav mješovite *online* i tradicionalne izobrazbe nastavnika glazbe u Ukrajini pokazao je pozitivne akademske rezultate uvođenja *online* nastave u instrumentalnu glazbu (Havrilova, Ishutina, Zamorotska i Kassim, 2019).

Istraživači sa Normalnog sveučilišta u Zhejiangu, u Kini, analizirali su mogućnosti za poučavanje etnomuzikologije u modernim učionicama. Analizirana je mogućnost korištenja mobilne *online* tehnologije za poučavanje etnomuzikologije, kao i utjecaj takve tehnologije na učenje. 82,5 % studenata uvjerenja je da bi ta tehnologija trebala biti dijelom modernoga glazbenog kolegija, čime bi se pospješila integracija tehnologije (Annand i Jensen, 2017).

Na Sveučilištu u Padovi, u Italiji, provedeno je istraživanje naziva Procjena suradničkoga *online* okružja za glazbene kompozicije. U njemu je testirana učinkovitost okružja za e-učenje u području glazbe. Sudionici su sudjelovali u *online* interakciji, koristeći sinkrone i asinkrone izvore za stvaranje novih glazbenih djela. Rezultati su pokazali da

su sudionici uspješno završili zadatak skladanja glazbe u virtualnom okružju. Nadalje, analizirani su timski rad, platforma, razlike u poučavanju licem u lice i u *online* obliku te snage i slabosti. Općenito gledajući, sudionici su pokazali razumijevanje mogućnosti koje im nude *online* alati i dostupni zadatci (Biasutti, 2015). Kao i u našem istraživanju, rezultati su pokazali da su sudionici uspješno ovladali glazbenom kompozicijom u virtualnom okružju, a akademski rezultati bili su pozitivni.

Raznolikost glazbe dostupne na internetu svaki dan postaje sve veća (Johnson, 2017b). Od istraživanja koje su proveli Groulx i Hernly (2010), broj ponuđenih magistarskih studija u glazbenom obrazovanju porastao je za 277 %. Glazbeno obrazovanje koje se provodi u *online* obliku postaje sve zastupljenije, što znači da nastavnici glazbe moraju biti svjesni aktualnih *online* trendova te dobro poznavati postojeće i dostupne programe (Johnson, 2017b). U ovomu je istraživanju također prepoznata potreba povećanja razine osviještenosti nastavnika i njihovih digitalnih kompetencija.

Primjene SWOT analize u digitalnom učenju opisao je tim znanstvenika iz Republike Bjelorusije (2018). Znanstvenici tvrde da obrazovanje u digitalnom obliku omogućava razinu obrazovanja neke populacije (Bogatko, A. V. i Bogatko, M. P., 2018), što je slično rezultatima našega istraživanja – digitalne kompetencije sudionika u procesu obrazovanja utječu na porast prosječnih postignuća od 6,49 %.

Zbog aktualnih zahtjeva koje nameću znanost i učenje, uloga nastavnika u poučavanju vokalnih tehnika pjevanja u *online* obliku jako je važna i vrijedna. Većina istraživača iz različitih zemalja razmatra mogućnost korištenja digitalne tehnologije u nastavi vokalnih tehnika pjevanja. Digitalna je tehnologija ne samo jako važna, nego može pomoći u procesu izrade modernoga, zanimljivoga i kreativnoga sadržaja.

Hipoteza istraživanja je potvrđena: primjenom inovativne digitalne tehnologije studenti postižu slične akademske rezultate kao i oni koji koriste tradicionalne nastavne metode, ali u grupi u kojoj se koristilo digitalno učenje postoji tendencija porasta u postignućima.

Zaključci

SWOT analiza o upotrebi Skype-a provedena je s ciljem analize poučavanja vokalnih tehnika pjevanja u *online* obliku i analize akademskih postignuća učenja i poučavanja vokalnih tehnika u *online* obliku.

SWOT analiza pokazala je da postoje važne snage u poučavanju vokalnih tehnika u *online* obliku, kao i nove prilike koje se mogu koristiti za njegovo unaprjeđenje. Analiza slabosti pokazala je da nastavnici s tradicionalnom izobrazbom trebaju unaprijediti svoje digitalno znanje i digitalnu pismenost. Kako bi unaprijedili svoje digitalne kompetencije i samostalni rad u digitalnom okružju, nastavnici s tradicionalnom izobrazbom pohađali su tečaj *Teorija i primjena digitalnoga učenja u studiju glazbe*. 87 % nastavnika s tradicionalnom izobrazbom unaprijedilo je svoje digitalne kompetencije tijekom ovoga tečaja.

Istraživanje je pokazalo da se akademska postignuća dviju grupa studenata (one koja je učila vokalne tehnike pomoću tradicionalnih metoda i one koja je koristila

Skype) nisu razlikovala (p> 0,05). Međutim, akademska postignuća mogu se povećati za 6,49 % ako se unaprijedi digitalna pismenost sudionika u obrazovnom procesu. S ciljem unaprjeđenja vlastitih digitalnih kompetencija i samostalnoga rada u digitalnom okružju, nastavnici s tradicionalnom izobrazbom pohađali su tečaj *Teorija i primjena digitalnoga učenja u studiju glazbe*.

Uspoređujući digitalni način poučavanja s tradicionalnim, može se jasno reći da je učenje vokalnih tehnika u *online* obliku moguće. Digitalna tehnologija postala je neophodna u obrazovanju. Ipak, njezina primjena u vježbama vokalnih tehnika može dovesti do određenih poteškoća kod nastavnika s tradicionalnom izobrazbom jer su oni odgovorni za obrazovanje studenata u području vokalnih tehnika. Nastavnikov je glavni cilj voditi računa o načinu disanja, što se ne može uvijek napraviti tijekom *online* nastave.

Rezultati istraživanja pomažu integraciji inovativnih digitalnih tehnologija u nastavu glazbe na visokoškolskoj razini, a da pri tome ne smanjuje učinkovitost nastave.

Buduća bi se istraživanja mogla fokusirati na implementaciju digitalne tehnologije u studijskim programima za vokalne tehnike u postojećim obrazovnim ustanovama, kako bi se nastavne tehnologije doradile i kako bi se izmjerila njihova učinkovitost.

Etika u izdavaštvu

Ovaj rad nije bio prethodno objavljen.