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MySolfeggio: MOBILE AND TABLET APPLICATION FOR LEARNING OF SOLFEGGIO

Izvirni znanstveni članek / Original Scientific Article

Abstract

The mobile and tablet application *MySolfeggio* is intended to be used for independent practicing of Solfeggio. The application is an upgrade of traditional printed literature for learning music theory, which is used during courses of music theory in Slovenian music schools. The app *MySolfeggio* allows practicing songs, which are included in the textbooks *Mali glasbeniki 3* (2014), *Mali glasbeniki 4* (2015), *Priročnik za solfeggio 3* (2008) and *Priročnik za solfeggio 4* (2008). The app works in such a way that a pupil directs the smartphone camera toward a certain notation in the textbook, makes a photo and the app recognises which song the pupil wants to practice. In this process, elements of augmented reality are used. Users of the app can listen to songs, practice rhythm and singing, as well as consolidate their knowledge about the songs by completing an integrated quiz about music theory. In order to examine the practical usefulness of the app *MySolfeggio*, we conducted an experiment on three Slovenian music schools. During the experiment, we precisely designed the methodology and the first results show that the pupils have developed a positive relation in regard to learning with the mobile application *MySolfeggio*. Moreover, there is also a tendency for using *MySolfeggio* as a learning tool at home.

Keywords: *MySolfeggio*, mobile application, information and communications technology, music theory

Izvleček

MySolfeggio: mobilna in tablična aplikacija za učenje solfeggia

Mobilna in tablična aplikacija *MySolfeggio* je namenjena samostojnemu učenju solfeggia. Aplikacija nadgrajuje tradicionalno tiskano literaturo, ki je sicer v uporabi pri predmetu Nauk o glasbi v slovenskih glasbenih šolah. Z aplikacijo *MySolfeggio* je tako mogoče vaditi glasbene primere, ki so zajete v učbenikih *Mali glasbeniki 3* (2014), *Mali glasbeniki 4* (2015), *Priročnik za solfeggio 3* (2008) in *Priročnik za solfeggio 4* (2008). Aplikacija deluje tako, da učenec usmeri kamero telefona na notni zapis v učbeniku, ga fotografira aplikacija pa razpozna, kateri glasbeni primer želi učenec vaditi. V tem postopku so uporabljeni elementi razširjenje resničnosti. Uporabniki aplikacije lahko nato glasbene primere poslušajo, vadijo ritmično in melodično izvajanje le teh, hkrati pa tudi utrjujejo svoje znanje o dotičnih glasbenih primerih z reševanjem kviza z glasbenoteoretičnimi

vprašanji. Da bi preučili praktično uporabnost aplikacije *MySolfeggio*, je bil izveden eksperiment na treh slovenskih glasbenih šolah. Prvi izsledki so pokazali, da so učenci s pomočjo aplikacije *MySolfeggio* razvili pozitiven odnos do samostojnega učenja, kaže pa se tudi tendenca, da bi učenci uporabljali mobilno aplikacijo kot učni pripomoček doma.

Ključne besede: *MySolfeggio*, mobilna aplikacija, informacijsko–komunikacijska tehnologija, Nauk o glasbi

The Development of the Application *MySolfeggio*

The boom of information and communications technology (ICT), the growing availability of smart devices and social acceptability of digital sources in education have lead developers of mobile applications to an increasing development of learning tools which would function on smart devices. As a result, growing interest for research of influences of usage of contemporary learning tools on user learning appear in different spheres of knowledge also in the research field.

The mobile and tablet application *MySolfeggio* was developed for solfeggio learning within the project *Mobile and interactive solfeggio learning with the help of augmented reality*[1]. Under the auspices of the Faculty of Education (PEF UM), Faculty of Electrical Engineering and Computer Science (FERI UM) at the University of Maribor, eight students from the departments of Musical Education, Media Communication, Informatics and Technologies of Communication and Information Technologies, as well as five members of the teaching staff from both faculties worked in the multidisciplinary project team.

This article presents several basic motivational factors for inclusion of ICT into the practicing of music theory and as a possible solution introduces the app *MySolfeggio*, which was developed as part of the aforementioned project and is suitable for usage.

This article is divided in three parts:
1) Connection between the course music theory in music schools and the usage of information and communication technologies;
2) Presentation of the mobile and tablet app *MySolfeggio* with elements of augmented reality;
3) First results of the research, in which the app was assessed.

Music Theory and Information and Communications Technology (ICT)

With the fast development of technics and technology, also the amount of knowledge that pupils have to gain during the learning process is growing. This development also affects education – with its new forms and methods of teaching, it has to be able to forward

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knowledge as efficiently, quickly and well as possible (Pančur, 1997). The exact same capability of forwarding knowledge belongs to ICT that is not especially mentioned or recommended in the Slovene curriculum for Music Theory (*Učni načrt. Nauk o glasbi / Curriculum. Music Theory,* 2003). It is known that ICT entered into music schools much later than into primary schools. According to Valant, this probably happened due to the specificity of music, "music as art and its musical moment which at a given time and space is unique, unrepeatable." (Valant, 2009, p. 57). Valant writes that the computer can sense real, objective components of music, such as pitch, intensity, speed, duration, but it cannot sense the nuances of expression and experience. These findings are correct – mostly when it comes to the artistic effect and performance of music, solo instrument playing or playing in various music formations (instrumental or vocal groups, ensembles). Learning music-theoretic elements and solfeggio, including the practicing of rhythmic punctuality and intonation, is especially in the beginning of musical development of an individual an objective act to which ICT may contribute greatly.

In Slovenia, the course music theory is divided into six years and is taught at music schools on the primary level. "With complex musical activities, the development of relative pitch, musical capabilities, skills and knowledge is stimulated. It introduces the pupils into the understanding of musical notes in a reproductive and productive way" (*Učni načrt. Nauk o glasbi / Curriculum. Music Theory*, 2003, p. 322). The content of the music theory curriculum is for each class divided into five sublevels – solfeggio (performing rhythmic content, singing melodic exercises with sol-fa syllables and the music alphabet etc.), performance and interpretation of examples from music literature (practicing singing technique, familiarisation with music literature, accustomation to assessment of one's own interpretation etc.), creating, listening and music-theoretic and form-related knowledge (clefs, time signature, scales, intervals, rhythmic duration, music alphabet, sol-fa syllables etc.).

Solfeggio is a complex field that particularly aims at developing different skills – relative pitch, rhythm recognition and chord recognition. The pupil cannot gain the required knowledge and capabilities regarding these skills only at school but has to upgrade them also at home (Pančur, 1997). However, the problem is, that at this stage, the pupils have not yet been trained enough to be able to practice solfeggio comprehensively and efficiently on their own. ICT can be a helping training tool because its multimediality eases the pupils' perception and prolongs the duration of their memory. Doing homework independently, the pupils can improve certain musical skills and develop their relative pitch and rhythm and chord recognition. Playing and practicing are also important strategies of ICT implementation (Valant, 2009). For younger pupils, computer learning environments, which support intuitive musical thinking and enable creative seeking of new solutions, are more appropriate (Borota, 2007).

In her article, Borota draws the attention to the following viewpoint of the usage of computer as well as information and communication environments. It is vital that the pupil "starts interacting with the content and not with the technology" as soon as possible. "Wasting time trying to master the technology first can affect the interest for music and technology negatively." (Borota, 2007, p. 31).

Tsolova and Angelova state that the research which was carried out with students at the Academy of Music in Sofia showed that there is a relatively high preference for the usage of practicing systems on mobile devices. According to the positive results of this research, they have come to the conclusion that electronic and mobile learning should gradually be developed and introduced into the musical educational system (Borota, 2007). Due to their size, mobility and prevalence, smart phones and tablets are the handiest.

Presentation and Usage of the App *MySolfeggio*

MySolfeggio is an app which can be used on smart phones or tablets. Its purpose is to upgrade the usage of literature in the courses of music lessons in primary music schools and make it more diverse. With it, pupils can practice solfeggio at home using music examples from the chosen literature. For the app, the textbooks *Mali glasbeniki 3* and *Mali glasbeniki 4* by the authors Tornič Milharčič and Širca Costantini were used, because their textbooks are the most widely spread in the music theory course at musical schools in Slovenia. Furthermore, handbooks *Priročnik za solfeggio 3* and *Priročnik za solfeggio 4* by Debevc were used for the app, because all six handbooks by this author are on the list of recommended literature on the music theory curriculum (*Učni načrt. Nauk o glasbi / Curriculum. Music Theory*, 2003). The app is designed in such a way that it can be upgraded with new music examples, regardless of the textbook. The target group were third and fourth grade pupils. They are already capable of using mobile devices and tablets, but are mostly not yet capable of independent practicing of music theory.

The app *MySolfeggio* includes a wide variety of functions[2] – the possibility to listen to music, practice rhythm and singing and solve a music-theoretic quiz that can cover all the aforementioned sublevels of music theory lessons. The app includes two efficient ways of learning – learning through game and practicing. For diversification, elements of augmented reality[3] with which we sense a certain music example in physical form were added.

The app *MySolfeggio* is simple to use. With the help of the camera on the smart phone or tablet, the pupil photographs the printed music example which is included in the app. After the photo has been taken, four options occur – "listening", "rhythm", "singing" and "quiz".

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[2] For the demonstration and manipulation of bar lines, the library SeeScore, Cross-platform Music XML Rendering (Dolphin Computing Cambridge Ltd.) was used. Accessible on: http://www.seescore.co.uk/. (13.5.2017).

[3] The sensing of music examples in the physical form with the help of augmented reality is enabled by the developer tool Vuforia.

Figure 1. *Screen display of the app – "listening"*

When choosing "listening", the users can listen to the vocal (musical alphabet, solmization or text) or to the piano version of the music example. If they choose the options "rhythm" or "singing", they can test themselves. The option "rhythm" enables the pupil to tap the rhythm on the screen of the smart phone or tablet, while the app senses the accuracy and gives feedback with a red or green signal. The same happens with the option "singing", where the app senses the pupil's tone and checks the intonation and gives feedback. If the notes are red, they were not performed in accordance with the acceptable deviation. Namely, the human voice cannot sing a certain tone accurately to the Hertz, so the deviation + or – 10 Hz from the ideal frequency was added to the programme.[4] In the case of rhythm, the deviation of + or – 0.15 seconds was taken into account.[5] The last option is the "quiz", which offers music-theoretic questions of the closed type (answers a, b, c, d) that are related to the photographed music example.

Empirical Research: Rating of the App *MySolfeggio*

With this research, the usefulness of the app *MySolfeggio* in practice for potential users was tested. The research was relatively broad-based; the primary interest was to find out whether the app was simple to use and understandable enough at the same time. The goal was also to find out how the pupils experience learning music theory with the app.

Methodological Approach and Conduct of Empirical Research

In this research, various research methods were used: experiment, method of observation and method of questioning. Before the beginning of the research, an agreement from all participants was acquired – from representatives of music schools, teachers and children's parents. An agreement from the ethical committee of the Faculty of Arts at the University

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4   The app senses the tone A4 with the frequency 440 Hz as correct if the user sings this tone with the frequency between 430 and 450 Hertz.

5   If the user tapped 0.15 seconds too fast or too slow, the tap was still recognized as accurate.

of Maribor, which confirms that the study corresponds to the standards of research, was also obtained.

The execution of the research comprised of four parts: 1) standard form of the music theory lesson with a music teacher, 2) first assessment session, 3) independent learning of solfeggio, 4) second assessment session.

In the first part, a standard lesson with a music teacher who worked according to a lesson plan took place. Working with the music example from the previous lesson, the teacher revised the pupils' knowledge on music-theoretic concepts: clefs, time signatures, scales, intervals, rhythmic duration, music alphabet and sol-fa syllables. After the music-theoretic part, the pupils performed the music example with the teacher's improvised accompaniment on the piano. The standard form of lesson is in this way intended for revision of knowledge about music-theoretic concepts and for vocal warm-up. After this, the pupils were acquainted with a new song which they practiced in the second part of the research by themselves. The teacher sang the song, so the pupils got a first impression about it. The third grade pupils got to know the song *Imam dolino zeleno* (Širca Costantini, Tornič Milharčič, 2014, p. 52) and the fourth grade students the song *Tinga Layo* (Širca Costantini, Tornič Milharčič, 2015, p. 57).

In the second part, the first assessment session took place. At first, the pupils received their identification numbers and wrote them down on the questionnaires. This assured the anonymity of the test. According to even and odd numbers, they were randomly divided into two groups which were sent into different classrooms. One of the groups was experimental and used the app in the third part of the research, whereas the other – control – group did not use the app. Afterwards, the pupils filled out the questionnaires. Their music-theoretic knowledge was measured on the basis of the song they were acquainted with in the first part of the research. Furthermore, the demographic characteristics of the pupils were measured, as well as their experience with the initial standard form of lessons with a teacher.

In the third part, independent practice of solfeggio took place. The pupils in the control group worked with a musical notation, they studied independently and had the opportunity to consult their teacher in case of confusion or difficulty. Here, the method of observation was applied – the researcher observed the way of practicing and the behaviour of the pupils and noted his findings on the report afterwards. The pupils in the experimental group used the app *MySolfeggio* on smart phones. It has to be underlined that all phones had comparable technical specifications. The method of observation was applied to this group as well; the relationship the pupils were building towards the app *MySolfeggio* and how the app influenced their individual practicing and behaviour was assessed. Similar to the pupils in the control group, the pupils in the experimental group had the opportunity to consult the teacher in case of confusion or difficulty. This was registered by the researcher.

In the fourth part, the second assessment session, which included two components – filling out the questionnaires and assessment of singing – took place. The pupils had to fill out the questionnaire about music-theoretic concepts regarding the music example once more.

In this way, the information about the level of knowledge of the research participants was acquired; the so-called before-and-after test was done. The results enabled a comparison between knowledge and the influence of the type of individual learning of music theory on the pupils' level of knowledge. Furthermore, the experience of independent learning of a music example was measured in the control group; rhythm, text, help with learning intervals with an instrument and attentiveness to intonation. In the experimental group, the relationship of participants towards the app *MySolfeggio* was measured. In the second half of the fourth part, the assessment of participants' singing took place. Members of both groups sang the music example. For the purpose of the subsequent thorough analysis, the recordings of the singing were carefully preserved. Afterwards, three teachers of music education – researchers – assessed them in accordance with the assessment report.

Due to the time limitation – the testing was limited to one lesson which corresponds to the usual duration of a solfeggio lesson at music schools – the experiment had to be limited only to two music examples: *Imam dolino zeleno* and *Tinga Layo*. The first executional part lasted 15 minutes and then the pupils had 10 minutes for the before-test. This was followed by 15 minutes of independent solfeggio practicing with or without the app respectively. The last 10 minutes were intended for the after-test.

Measuring Instruments

As measuring instruments, questionnaires and assessment reports were used. Based on empirical and research questions, which lead the whole research, research variables were identified and measuring instruments were established accordingly. These were slightly distinguished in respect of the fact, whether they were meant for the pupils of the third or fourth grade or whether they were for the control or the experimental group.

There were three types of questionnaires in the first assessment session: a demographic questionnaire, a questionnaire about the experience of the lesson in the classroom and a questionnaire about music-theoretic concepts linked with the music example concerned. With the demographic questionnaire, variables such as gender, age, year of music school, number of years of preparatory music schooling, music education of parents, music instruments that the pupils play and the type of independent practicing of music theory at home were measured. Furthermore, the pupils self-evaluated their own knowledge of music theory on the scale from 1 to 5, 1 meaning very bad and 5 very good. The likeability of different types of independent learning of music theory was also measured; how fond the pupils were of learning with a music notation, an instrument, a smart phone or tablet and a personal computer. For the purpose of measuring the level of early knowledge of ICT usage, the pupils assessed themselves on a scale from 1 (no knowledge or very bad) to 5 (excellent).

The second questionnaire measured the experience of participants in the classroom lesson. The focus was on their relationship towards the activities in the music theory lesson, which was measured with the "Classroom Experience Questionnaire" (Nijs, Leman, 2013). The participants of the research had to mark on the 5-point scale whether they agreed with the given statements. If they chose 1, they did not agree with the statement at all, whereas 5 meant they agreed with it completely.

Afterwards, the participants received the third questionnaire along with the printed notational material – the music example. Their knowledge on music-theoretic elements, which were related to the music example, was tested with a closed-ended questionnaire. This questionnaire involved questions about the scale, time signature, composer, first interval measure and the longest note value in the music example. The questionnaire tested the pupils' basic knowledge on music-theoretic elements.

During the independent learning of solfeggio, the researchers primarily observed the behaviour of the research participants. The researchers assessed the behaviour parameters when the pupils were using the mobile app. For this, an adapted version of the questionnaire from the literature (Cano, Sanchez-Iborra, 2015) was used. The focus was on the simplicity of the usage of the app – to find out, whether the pupil was able to start the app and use it easily; the intuitiveness of the app – whether the pupil could find out, how the app works; attention – whether the pupil was able to activate it and keep it activated in order to get appropriate information; thinking – whether the pupil was capable to transfer the newly acquired principles into different contexts and develop new principles for general and new situations; memory – whether the pupil was able to learn and memorize new information; the mood during app usage – whether the pupil showed signs of good mood (laughter, verbal expressions of happiness, enthusiasm, high level of excitement or energy etc.). The researchers' task was also to measure, how often the pupil asked the teacher for help, while he was using the app, and what the specific reasons were for that.

In the second assessment session, the pupils received the questionnaire about music-theoretic concepts for the second time. In this case, it was an open-ended questionnaire. When the research participants sang the music example in the end, the assessors, who were academically educated music teachers, assessed the performance with a 5-point scale (1 meaning very bad, 5 meaning very good) in accordance with rhythmic accuracy, intonation, text and interpretation.

Research Sample

The research was conducted on 30 and 31 May 2017 on the Music School Ljubljana Vič Rudnik, Conservatory of Music and Ballet Ljubljana and Music School Ljubljana Moste – Polje. 42 pupils took part in the research – half of them were in the third grade and half in the fourth grade. In each group, there were 21 pupils – 13 boys and 29 girls. The average age was 10 years – the youngest pupil was 9 and the eldest 13. The majority played the piano and the rest the flute, saxophone, violin, violoncello, guitar, drums and xylophone.

Primary Results of the Research

In this part, the primary qualitative results of the testing will be presented. After the pupils stopped using the app *MySolfeggio*, the experimental group of pupils was asked, whether they liked it and what they liked or disliked the most. The majority agreed that the app was understandable and interesting. They said it was easy to use and to find out how it is used. Furthermore, they were excited about the fact that they received immediate feedback concerning their singing. The pupils were also eager to know, when they would be able to use the app for practicing solfeggio at home on their own. Concerning the things they liked the least, the pupils said that the app should offer more than two music examples for practicing solfeggio. One pupil pointed out that the app should warn the user before it starts to measure the rhythm.

While the pupils were using the app *MySolfeggio*, they were also observed. It turned out the majority was using the app with excitement and the pupils wanted to sing the song over and over in order to accomplish better results. They also gave very positive answers to the question, basing on five statements, with which their opinion about independent solfeggio practicing with the help of the mobile app was measured. The pupils ranked the statements on a 5-point scale, where 1 meant that practicing with the app was very boring and 5 that it was very interesting. The average estimated value was 4.45 (SD = 0.53) which indicates that the independent solfeggio learning activities with the app were interesting for the pupils.

The control group which did not use the app for independent solfeggio practicing showed a significant difference in terms of commitment to learn. While a few pupils actively practiced by singing and practicing the rhythm and even wrote the sol-fa syllables on the musical notation, the rest were bored and did not use the time available for practice fully. These pupils also ranked how interesting the learning activities for independent solfeggio practicing with the musical notation were with the help of a 5-point scale – 1 meant that the activity with the musical notation was very boring and 5 that it was very interesting. The average estimated value was 4.32 (SD = 0.74) which indicated that independent practicing without the mobile app *MySolfeggio* indeed was interesting, but slightly less than the one with the mobile app.[6]

Conclusion

The technics and technology are developing swiftly, which determines the amount of knowledge, the pace, effectiveness and quality of teaching. In the future, ICT will certainly become more and more integrated into our everyday life. The app *MySolfeggio* helps in a way that is rational and effective from the point of giving feedback about the knowledge of pupils.

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6   Due to the fact that the research sample was relatively small, a more extensive app testing is planned and will be followed by an accurate statistic data analysis.

MySolfeggio includes two effective ways of learning – through game and practicing. When creating the app, special attention was given to the simplicity of app usage, which enables the pupils to quickly connect with the content, so that the technology does not inhibit them. Since the app gives a relatively simple technical experience, the user can interact with the content quickly and without unnecessary interruptions. The app is intended for mobile phones and tablets, which are simple to use, handy and portable.

With the app, pupils can practice certain musical skills at home independently and develop their rhythm recognition and relative pitch. Moreover, it implements all five components of music theory – solfeggio, performing and interpreting different examples from music literature, creating, listening and music-theoretic and form-related knowledge. The first tests also showed that it is possible that multiple pupils use the app in class or in the same room simultaneously. Therefore, the app offers a wide variety of possibilities for solfeggio practicing at home or anywhere else, when the pupils do not have the chance or the required knowledge to practice solfeggio with an instrument.

It has to be underlined that the app *MySolfeggio* can in no way replace the standard form of learning solfeggio at a music school, because it cannot sense certain nuances, relevant for expressing and experiencing of different musical examples. In spite of certain limitations, the app offers a variety of options for practicing of music-theoretic elements and solfeggio, including rhythmic and intonational accuracy particularly in the beginning of musical development of an individual. Especially in the initial phase of music theory learning, this is an objective act to which such ICT can be of great help.

The first test results of the app *MySolfeggio* are very encouraging. They showed that it can motivate the user to practice music theory relatively highly. Its multimediality also eases the perception and prolongs the duration of memory.

In the future, the range of options that the app offers will be extended and the app itself will be adjusted to the user experience. The literature, featured in the app, and the range of musical examples for practicing will have to be extended. The visual appearance of the app and its outreach need to be improved, so that it will not be available only on Android devices, on iOS and Windows devices as well. *MySolfeggio* is certainly the only program of its kind in Slovenia and the only program with such a design in the world; therefore, it is worth of further development, extending and the broadest user reach possible.

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Povzetek

Z razmahom uporabe informacijsko-komunikacijske tehnologije in z vse večjo dostopnostjo do t.i. pametnih elektronskih naprav, kot tudi družbeno sprejetostjo digitalnih virov v izobraževanju, se med razvijalci mobilnih aplikacij povečuje zanimanje za razvoj sodobnih učnih pripomočkov, ki bi delovali na omenjenih napravah. Posledično je mogoče zaslediti vse večje zanimanje za raziskovanje vplivov uporabe sodobnih učnih pripomočkov na učenje uporabnikov v različnih domenah znanj tudi v raziskovalni sferi.

Za namen učenja solfeggia je bila v okviru projekta *Mobilno in interaktivno učenje solfeggia s pomočjo nadgrajene resničnosti* razvita mobilna in tablična aplikacija *MySolfeggio*. Slednja nadgrajuje tradicionalno tiskano literaturo, ki je sicer na nižji stopnji v uporabi pri predmetu Nauk o glasbi v slovenskih glasbenih šolah. Aplikacija deluje tako, da učenec usmeri kamero telefona na notni zapis v učbeniku, ga fotografira, aplikacija pa razpozna, kateri glasbeni primer želi učenec vaditi. V tem postopku so torej uporabljeni elementi razširjenje oz. nadgrajene resničnosti. Uporabniki aplikacije lahko nato glasbene primere poslušajo, vadijo ritmično in melodično izvajanje le teh, hkrati pa tudi utrjujejo svoje znanje o dotičnih glasbenih primerih z reševanjem kviza z glasbenoteoretičnimi vprašanji. Aplikacija tako posega na vseh pet področij predmetnika Nauka o glasbi – solfeggio, izvajanje in interpretacija primerov iz glasbene literature, ustvarjanje, poslušanje ter glasbenoteoretično in oblikovno znanje. Na ta način ponuja širok nabor priložnosti za učenja solfeggia in komplementarnih glasbenih vsebin doma ali kjer koli drugje, kadar učenci nimajo možnosti ali znanja vaditi le teh s pomočjo instrumenta.

Da bi preučili praktično uporabnost aplikacije *MySolfeggio*, je bilo na treh slovenskih glasbenih šolah izvedeno testiranje različnih vidikov uporabnosti in funkcionalnosti aplikacije. Izsledki testiranja so pokazali, da so učenci s pomočjo aplikacije *MySolfeggio* razvili pozitiven odnos do samostojnega učenja, kaže pa se tudi tendenca, da bi učenci uporabljali mobilno aplikacijo kot učni pripomoček doma. Testiranje je sicer pokazalo, da aplikacija *MySolfeggio* ne more nadomestiti klasičnega pouka učenja solfeggia v glasbeni šoli, saj ni sposobna zaznati nekaterih nians bistvenih za izražanje in doživljanje posameznega glasbenega primera. Navkljub nekaterim omejitvam pa aplikacija posamezniku, posebej v začetku glasbenega razvoja, ponuja obilo priložnosti za podporo učenja solfeggia in drugih glasbenoteoretičnih vsebin. Le to je na začetni stopnji Nauka o glasbi v prvi vrsti objektivno dejanje, ki mu je tovrstna informacijsko-komunikacijska tehnologija lahko v veliko pomoč.