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9. ENHANCING TRADITIONAL MUSIC TEACHING WITH INTERACTIVE TECHNOLOGY

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Abstract: *The article presents a web application for promoting singing and strengthening the literacy process, helping teachers and students in the process of music education. The program includes technological innovations in the field of voice synthesis and analysis based in AI and machine learning, along with elements for learning the musical language proposed in the past by Dalcroze, Orff and Kodály.*
Key words: *singing, music education, music literacy, individual practice*

1. Introduction

How does contemporary school music education differ from the methods used in the first decades of the 20th century? About a century ago, students sat lined up at desks, had textbooks or songbooks (some of them), the teacher exemplified the melody vocally or instrumentally, and the students began to imitate it during many repetitions until finally, they managed to master it. Learning songs were done by ear, "intuitively," or "imitatively." The audio-video technology of that era allowed for sound recording but separately from image processing. Synchronizing sound with image was still a technological challenge that lay ahead until almost the middle of the XX century. The education system of the respective times could not directly benefit, on a mass scale, from the technology of recording and playing sound.

2. Discussions

What happened in the first decades of the 21st century regarding music education in public, primary schools? Activities of "movement" were introduced into music lessons in the first grades of the primary cycle, and generally, schools adopted online audio-video technology for classroom teaching.

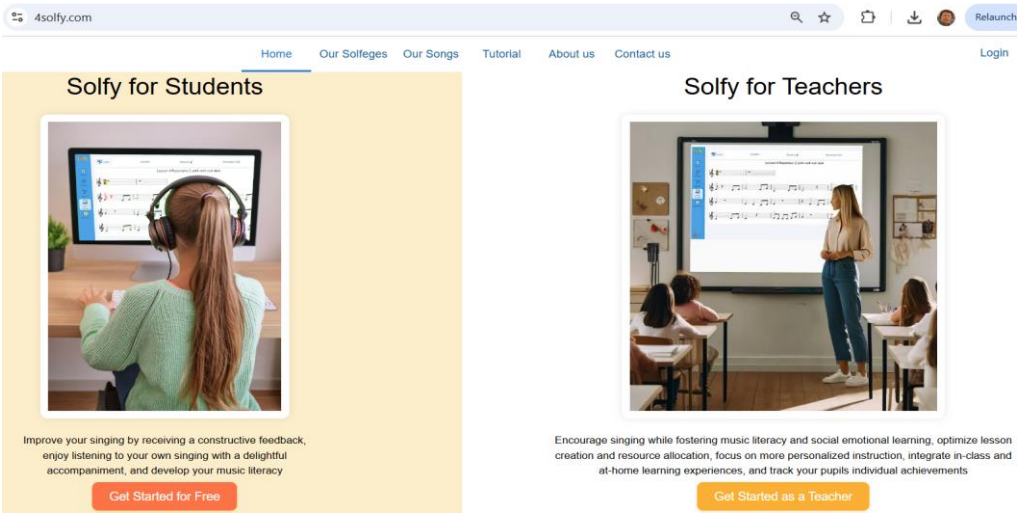

Fig. no. 1 Solfy's public page at https://4solfy.com/

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One of the educational web applications designed to be a didactic auxiliary for teaching in school and simultaneously an interactive environment for individual and differential practice at home is Solfy (https://4solfy.com/). It include a path for the teachers and another one for students. It is results from six years of research and development to help teachers and students promote singing and initiation in music literacy, beginning with elementary school.

The interface is in Hebrew, English, and Romanian, and we are considering expanding the translations and adding other languages. It includes a Song Unit (in Hebrew, English, Romanian, Slovak and Latin – and we are considering expanding the diversity of the repertoire with more songs from the children folklore from different countries), a Solfege Unit, and a Theory Drills Unit.

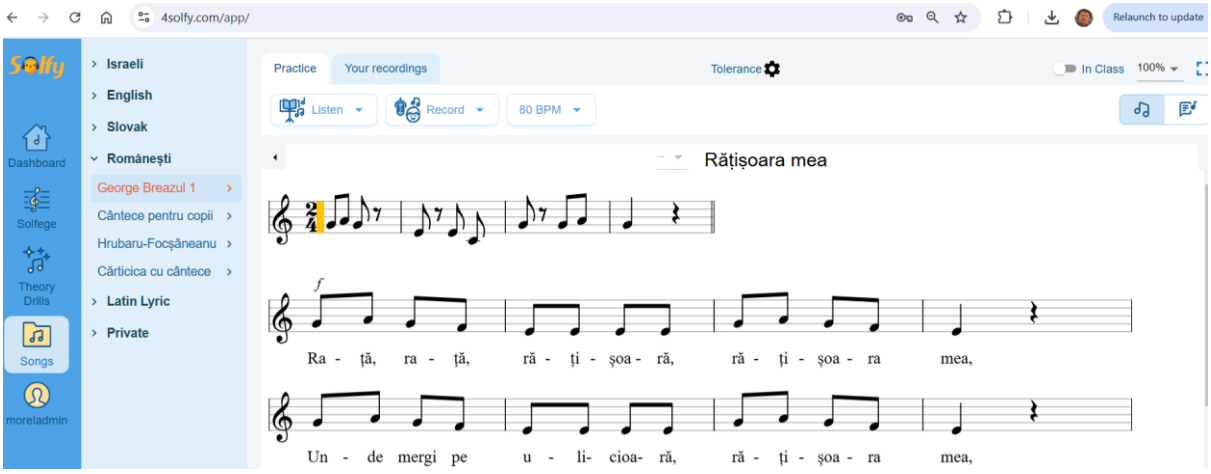

Fig. no. 2 The Songs Unit

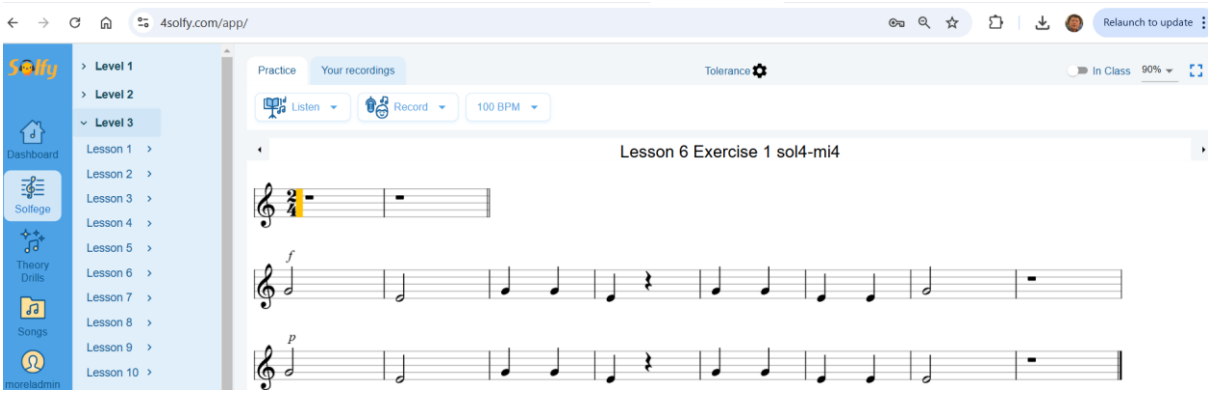

Fig. no. 3 The Solfege Unit

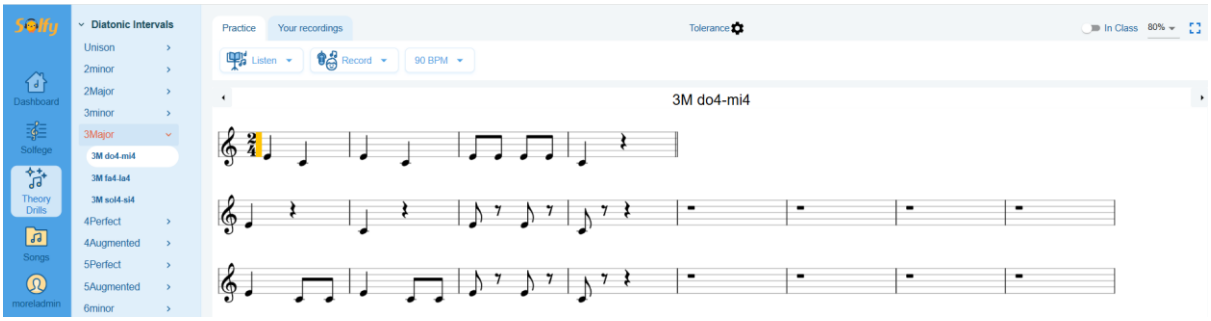

Fig. no. 4 The Theory Drills Unit

The program can "sing" songs with natural voices or solfège with synthesized voice sounds, record the user singing, compare the result with the original, and give

feedback in a music score. Successful recordings are prized with pleasant accompaniments, points, and virtual assets. The teacher can remotely monitor and coordinate students' activities to offer help.

3. Results

In the modern period, in which the education process is required to be more centered on the student's needs, a new perspective on the practice of vocal singing in primary classes is needed. Such a non-existent possibility in the past is offered now to the students with the option of individual and personalized practice with immediate feedback and evaluation at home. Undoubtedly, adding individual studies based on modern methods carried out outside of class hours will save time and increase the efficiency of the educational process. As a direct result, the schools can expect an increase in the number and quality of school choirs and vocal groups. At the same time, the number of students who will start studying a musical instrument will likely increase in proportion to the expansion of the implementation of this program.

Implementing the program in school will help promote accessibility and inclusion, tailoring the participants' activities so everyone can engage meaningfully. Completing the traditional methods of teaching music in the classroom, Solfy allows the student to listen to the learned songs or solfège when and where he wants, offering individual and differential practice, recording himself singing, and receiving feedback. Solfy's interactive format allows to:

1. Display the song with a dynamic marker that permits at each moment to see the notes and listen in synchronization to the sound (pitch and duration) and lyrics.
2. Present the songs in different scales, offering the option to choose from and adjust the tonality accordingly with the class or choir possibilities.
3. Be more accessible, presenting the song in different tempo values, beginning with a low tempo value and gradually progressing to a higher value.
4. Save time teaching songs and solfege in the classroom. At the school, only the teacher uses Solfy for approximately 10 - 12 minutes with a projector and sound system, singing together and explaining what the students need to practice at home. All these activities, in symbiosis with the traditional methods of teaching music in the classroom.
5. Add the needed individual and differential study time at home, benefiting from the AI guidance of Solfy: receiving feedback, musical prizes (listening to a successfully recorded piece, sounded with a nice accompaniment), virtual assets, and progress reports.
6. Monitored students' activities remotely to stay updated and offer help when needed.

Fig. no. 5 Statistics with the records and cumulate score (in points)

4. Conclusions

Implementing the program in school will help promote accessibility and inclusion tailoring the activities of the participants so everyone can engage meaningfully. By analysing the accumulated data, teachers and researchers can study it, conclude, and write articles on music education in the 21st century, suggesting that colleagues adopt and implement it in their schools for better results in a shorter time.

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