DIGITAL MIXING TOOLS IN THE DEVELOPMENT OF MUSICAL SKILLS

FERRAMENTAS DIGITAIS DE MIXAGEM NO DESENVOLVIMENTO DE HABILIDADES MUSICAIS

HERRAMIENTAS DE MEZCLA DIGITAL EN EL DESARROLLO DE HABILIDADES MUSICALES

Glauber Lúcio Alves SANTIAGO
Federal University of São Carlos (UFSCar)
e-mail: glauber@ufscar.br

Caroline Torkomian JOAQUIM
Federal University of São Carlos (UFSCar)
e-mail: carolinetork@gmail.com

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How to refer to this article

ABSTRACT: *The article presents a software, which is the digital audio workstation Cakewalk by BandLab and the website Cambridge Music Technology (section: The 'Mixing Secrets' Free Multitrack Download Library) as tools with high potential educational for* free use *and with professional quality, in terms of the commercial process of music production. In the end, a list of musical skills based on literature is presented, and suggestions of which the student can improve during the practical activity of mixing phonograms.*

KEYWORDS: Mixing. Musical skills. Musical production.

RESUMO: *O artigo apresenta um software, sendo a estação de trabalho de áudio digital Cakewalk by BandLab, e o site Cambridge Music Technology (sessão: The 'Mixing Secrets' Free Multitrack Download Library) como ferramentas com alto potencial educacional por serem de uso gratuito e com qualidade profissional, em termos do processo comercial de produção musical. Ao final, é apresentada uma listagem de habilidades musicais baseada em literatura e sugestões de quais delas podem ser aprimoradas no estudante durante a atividade prática da mixagem de fonogramas.*

PALAVRAS-CHAVE: *Mixagem. Habilidades musicais. Produção musical.*

RESUMEN: *El artículo presenta un software, que es la estación de trabajo de audio digital Cakewalk by BandLab y el sitio web Cambridge Music Technology (sección: La Biblioteca de Descarga Multipista Gratuita 'Mixing Secrets') como herramientas con alto potencial educativo por ser de uso gratuito y con calidad profesional, en cuanto al proceso comercial de producción musical. Por fin, se presenta una lista de habilidades musicales basadas en la literatura y sugerencias de cuáles pueden ser mejoradas por el alumno durante la actividad práctica de mezclar fonogramas.*

PALABRAS CLAVE: *Mezcla. Habilidades musicales. Producción musical.*

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Introduction

Music production processes and technological resources have always influenced music learning. Thus, for example, while a musician performs, he also learns; by means of his technological resources (instrument, score, recording/playback device, etc.), he develops his musical abilities. In this context, the article is based on the premise that the process of mixing, as a component of the process of the musical production of phonograms[1], allows the exploration of various musical skills, providing music learners with an interesting field to explore and music teachers with a new didactic tool. The final goal of this article is to indicate a list of musical skills that can be practiced and developed through a mixing process.

The article is structured in the following way: presentation of a music production software, which is the digital audio workstation (DAW[2]) Cakewalk by BandLab and the Cambridge Music Technology website (in the section: The 'Mixing Secrets' Free Multitrack Download Library[3]) as tools with high educational potential by being free to use and with professional quality, in terms of the commercial process of music production. Next, the text describes the mixing process using this site and the software. Then, a list of musical skills is presented based on literature. Finally, suggestions are given as to which of these can be improved by the student during the practical activity of mixing phonograms.

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First, however, a brief background on music technology resources and other research that has been done using the open phonographic collection on the Cambridge Music Technology website is given as follows.

According to Owsinski (2010, p. 3, our translation), "[...] although music recording dates back to 1857, it did not become a commercial business until 1900". From the early 20th century, the recording industry became mature and centralized by large companies. However, according to Nakano (2010), technological development provided, notably since the 1950s, apparent transformations in music production. If phonographic production was centralized by large companies with a small diversity of products at a certain moment, we could see many diverse and decentralized productions over the decades.

According to Lima (2012, p. 197, our translation), "[...] the ways of producing, disseminating, and listening to music have been undergoing significant transformations in contemporary times due to the changes brought about by the digitalization of the music chain".

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[1] Phonogram is a technical term for a musical work recorded in audio, format, or media.
[2] Digital Audio Workstation is software that manipulates multi-track audio, among other features. Some examples are Avid Protools, Logic Pro, Garageband, Steinberg Cubase, Cockos Reaper, and the Cakewalk by BandLab.
[3] Available at: https://www.cambridge-mt.com/ms/mtk/. Accessed: 12 Aug. 2022.

To disregard access to such technological music production resources in music teaching is to limit learning and not integrate and interact with the current context.

Given the importance of integrating technology, especially digital information and communication technologies (ICT), and living in a world of increasing demand for new digital technologies through computers, laptops, tablets, and cell phones, the demand for such resources in music-making and teaching is growing. Currently, the advancement of research on digital technologies has been the subject of several studies, providing new ways to learn and teach music in various academic and social contexts (CERNEV; MALAGUTTI, 2016). With the increased presence of computers and low-cost devices, in addition to the ease of using programs with visual interfaces or intuitive programming, new educational tools have become possible (MENESES; NOVO, 2015). Consequently, the interaction between music and technological resources can expand learning and the universe of musical possibilities.

For Cunha and Martins (1998), computational tools can assist in developing auditory perception, sound organization, and other areas of musical knowledge. Thus, they state:

> This new environment, composed of individuals who act through various tools using a multifaceted musical language, generates new aesthetic and sound patterns. Therefore, the educational approach has to take into consideration all the elements that make up this scenario in order to provide learning environments that lead the individual to act, reflect, and express their ideas in today's society (CUNHA; MARTINS, 1998, p. 3, our translation)

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This article aimed to focus on the open phonogram library entitled 'Mixing Secrets' Free Multitrack Download Library. The interesting thing about this library is that it allows for a plethora of research involving multiple areas. The following are some of these researches published in scientific articles to show that the site presents rich content for the music researcher. However, it is not related to educational aspects.

a) Variations in multitrack mixing: analysis of low audio[4] signal characteristics. The article (WILSON; FAZENDA, 2016) analyzes 1501 mixes of 10 different songs created by mixing engineers. The final intent is to understand the mixing processes to promote the development of intelligent music production tools capable of generating mixes that would be really similar to those created by a mixing engineer or even optimize such processes.

B) Evaluation of the dataset in the mix[5]. The article (DE MAN; REISS, 2017) presents a dataset consisting of mixes gathered in a real context (by experienced engineers in their

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[4] Original title: Variation in Multitrack Mixes: Analysis of Low-level Audio Signal Features.
[5] Original title: The mix evaluation dataset.

preferred environment and using professional tools) and their perceptual evaluation, which can be used to expand the knowledge about the mixing process.

C) Audio[6] processing chain recommendation. The article (STASIS *et al.,* 2017) analyzes how audio engineers apply complete processing chains to music audio.

(d) Perceptual evaluation of music[7] mixing practices. The article presents "[...] an experiment in which varied mixes of different songs, obtained with a representative set of audio engineering tools, are evaluated by experienced people in the field" (DE MAN *et al.,* 2015, p. 1, our translation).

These four articles listed illustrate well the types of research that have been conducted with mixed repositories, and we see the scarcity of research related to the educational issue. An extensive library that lends itself to educational use is also researched from an academic perspective. This is what this paper proposes to do.

Affordable professional music production with Cakewalk by BandLab

Up to this point, the article has given a general context. Now it will focus on professional software for recording/mixing that has been made free. The discussion follows.

As Souza (2004, p. 1-2, our translation) brings

> Science, Technology, and Culture are fundamental, recognized bases for social development linked to economic development. Knowledge enables people to discuss their role in achieving freedom and social and personal development.

Thus, it is essential that access to technologies, including those related to music production, be made widely available. In this context, in 2018, the company BandLab acquired the intellectual property of Cakewalk Inc. It carried out the relaunch of this company's main software, Sonar, renaming it then as Cakewalk by BandLab and made it free, made available for the Windows operating system.

BandLab describes itself as a social music platform that allows creators to make music and share the creative process with musicians and fans. The company's software combines music creation and collaboration tools (such as cross-platform DAW and software with social video and message-sharing capabilities). The company proposes as its mission to break down

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6 Título original: Audio processing chain recommendation.
7 Título original: Perceptual Evaluation of Music Mixing Practices.

technical and geographical and create barriers between its global community of creators and collaborators by providing this service for free and, until then, unlimited (BANDLAB, 2021).

In this article, the use of Cakewalk by BandLab software has relevance to the democratization of knowledge regarding professional music production for music students and the educational possibilities its use can provide.

'Mixing Secrets' Free Multitrack Download Library: A gateway to mixing practice

Currently, a few sites distribute open multitracks that is free for educational[8] use. One site that stands out on this front is Cambridge Music Technology[9]. The site is intended primarily to disseminate recording and mixing knowledge offered by the author of technical literature on the subject and award-winning engineer Mike Senior (CAMBRIDGE MUSIC TECHNOLOGY, 2021). The site has several sections, all very interesting, but for the present article, we focus on "the huge 'Mixing Secrets' Free Multitrack Download Library for students/teachers". The following is a description of the section, according to the website:

> To support readers of my book Mixing Secrets For The Small Studio and music technology students/teachers in general, here is a list of free downloadable multitrack projects for mixing practice purposes. These projects are presented as ZIP files containing uncompressed WAV files (24-bit or 16-bit resolution and 44.1kHz sample rate). For maximum mixing flexibility, the contributors have made every effort to provide 'raw' audio, i.e., without additional effects or processing (other than treatments applied during recording/editing). When importing tracks, make sure that all files start at the same moment within your DAW's timeline. In addition to full multitrack packages, many quick download versions of edited excerpts (usually with the biggest chorus of the song) provide packages for mixing in sizes suitable for classroom use (CAMBRIDGE MUSIC TECHNOLOGY, 2021, , our translation).

In the 'Mixing Secrets' Free Multitrack Download Library section, hundreds of projects (open music pieces) are available. In addition, the section gives access to the forum. This is a forum in which thousands of posts are made with the finished mixes of users, where they can interact with each other and exchange knowledge.

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[8] Examples of other similar sites are: HomeRecording.com's Mix This! Forum, Indaba Music, MixOff.org, Multitracks from Telefunken, PureMix, and Shaking Through.
[9] Available at: https://cambridge-mt.com/. Accessed: 10 Oct. 2022.

General aspects of mixing

According to Bregitzer (2007), phonographic production has six stages: preproduction, basic tracking, editing, overdubs, mixdown, and mastering. This article focuses on the second-to-last stage being the pure mixdown, without any edits or re-recording that may occasionally occur in the mixdown stage.

In a simplified way, we can say that the idea of mixing is to take several separate/raw audio tracks (possibly already edited in the DAW) from a multitrack recording and apply equalization[10], dynamic compression[11], volume, pan[12], ambiance (reverb[13]) and other effects to obtain a finished phonogram (master) of a single track (usually stereo).

David Gibson, in his book The Art of Mixing (GIBSON, 2019), presents several elements that should be considered by the mixing professional, including a visual representation of sounds, mixing styles, considerations about the piece of music, other people involved in the process, volume controls, equalizers, pan, effects (reverb, delay, chorus...), dynamics controllers, the mixing process itself, automation, and mastering. These various aspects already foreshadow some musical skills to be presented at the end of this article, especially those related to aural skills.

In this article's proposal for teaching/using mixing, the concept of mixing in the box must be considered. That is, a mixing process performed entirely on the computer. Thus, a mix-in-the-box does not require the use of expensive physical equipment (mixing desks, compressors, effects, etc.), which is recommended for an educational process accessible to more people[14].

Savage (2014) indicates that for a good mix, it is important to have a concept or an idea of how the piece should sound. These concepts can start with a more informal vocabulary, such as "smooth" and "warm," but then should turn into more technical specifications involving equalization, compression, reverb, etc. He advises having other phonograms as a reference during the mix and using a visual model like the one exemplified in Figure 1, where the outer

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[10] Equalization is related to modifying the sound intensity in a specific frequency range, e.g., making the audio higher-pitched, lower-pitched, lower-bass, lower-mid, etc.

[11] Dynamics refers to the variation of intensity in the audio. Compressing dynamics means making this variation smaller, usually using processors such as compressors, limiters, and expanders.

[12] Pan comes from panning, which refers to the panoramic sensation of the audio source in the mix. For example, "the trumpet is further to the left, and the saxophone is further to the right in this phonogram".

[13] Reverberation is the acoustic effect that comes from the various reflections of a sound in an environment. It gives the feeling of ambiance, i.e., "what kind of room the musician recorded in and where the listener is located in this room".

[14] It is important to point out that, nowadays, audiophiles consider in-the-box mixing inferior quality, but all the processes that take place in a box mix, or not, are the same.

parallelepiped represents the space imagined for the musical group's performance, and the inner parallelepipeds, the location of the instruments/voices. For example, in the central front part below, the cube could represent the bass drum, with a very low sound, in the panoramic center and very close to the listener (no reverberation).

Figure 1 - Metaphor of the three-dimensional mix
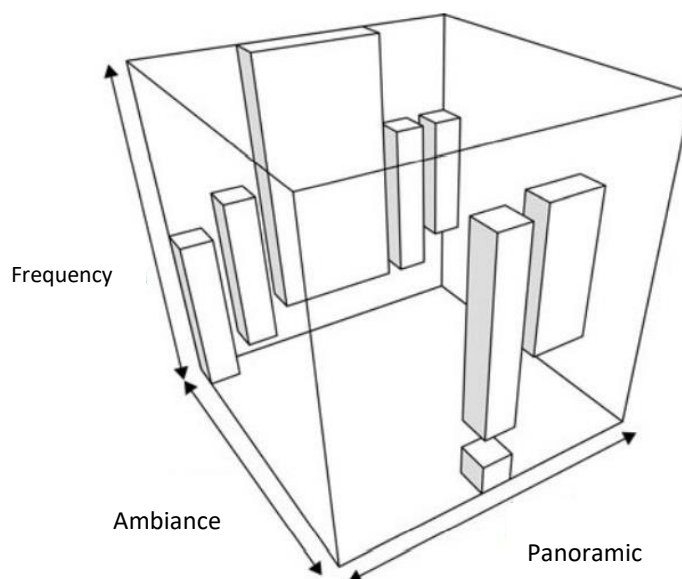
Source: Adapted from Savage (2014, p. 24, our translation)

The author further indicates that the monitoring level should be paid special attention to. In this respect, he presents the following issues:

a) Ear fatigue. Although listening to music loudly to pay attention to details is necessary, this causes mental fatigue. His tip is to "start the day listening as quietly and comfortably as possible" (SAVAGE, 2014, p. 29, our translation).

b) "Everything sounds better when it's louder!" (SAVAGE, 2014, p. 29, our translation), this phrase should be considered in its pros and cons in the mixing process.

c) Vary the listening level. The author explains some psychoacoustic factors that justify the need, during mixing, to use different sound intensities in monitoring.

For Owsinski (1999, p. 9, our translation), six elements must be considered in a mix:

> Balance (the relationship between the volume level of musical elements), Frequency Range (having all frequencies properly represented), Panorama (placing a musical component of the sound field), Dimension (adding ambiance to a musical element), Dynamics (controlling the volume envelopes of a track or instrument), and Interest (making the mix special).

This information has been provided in this article to give the reader some insight into the complexity of the mixing process, as well as some of the knowledge needed to understand the process fully. To learn practical aspects of how to mix for musical study, follow the content of the next paragraph.

For the music student, the layman in mixing, to be able to perform a mix using the multitrack recordings provided by Cambridge Music Technology and the Cakewalk by BandLab software, we recommend following the explanation in the video Complete Beginner's Guide to Mixing: Practical Approach in the Box (SANTIAGO, 2021), made available through the link: https://youtu.be/agQTPO9mCsg. The reader who needs to gain practical knowledge of mixing this foray is fundamental to understanding the suggestions for educational use at the end of this article.

Types of musical skills/knowledge

As mentioned earlier, this article suggests a list of musical skills that can be developed during a phonogram mixing activity. However, it is important to have a general list of musical skills.

Listing the skills needed for musical activity is not at all simple. The social and historical context influences such a list. Some researchers try to address the issue as the one found in the article Conceptions of Musical Ability (HALLAM; PRINCE, 2003), where the authors indicate that "Musical ability is now seen by many as a social construct, acquiring different meanings in different cultures, subgroups within cultures, and at the individual level" (p. 2, our translation).

In another article, one of the authors, Susan Hallam (2006), indicates a list of 24 skills organized into seven categories, which can serve as a guideline for the proposal of the present article. It is a very interesting listing and makes it possible to explore musical skills that could be more obvious, such as learning and life skills. However, the listing lacks a detailing of some more direct musical aspects. Therefore, additionally, we chose to consult the benchmarks for music education for American K-12[15] as per Joseph (2011) - which brings a very practical listing of knowledge/skills.

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15 It would be equivalent to Basic Education in Brazil, that is, primary and secondary school

Suggestions of musical skills and knowledge to be developed in a mixing process

Considering the skills that contribute to musical development according to Hallan, the following possibilities for educational use in the mixing process are suggested in Table 1, which contains in the first column the skill/knowledge, in the second column the possible correlation with the mixing process (none, indirect or direct), and in the third column a comment about how this relationship occurs.

Chart 1 - Suggested correspondence between the skills/knowledge in Hallam (2006) and the mixing process

Skill/knowledge	Correlation with the mixing process	Comment
1. Habilidades auditivas:		
a) Rhythmic accuracy and sense of pulse.	Direct	In the mix, it is important to explore rhythmic accuracy, especially for tempo marking, which is essential in the case of delay adjustments.
b) Good intonation.	Indirect	During active listening, which is natural to the mixing process, pitch observation is developed. Thus, one can benefit from performance enhancement by improving one's listening.
c) Ease of knowing how the music will sound before playing it.	Direct	It is part of the job in the mix to imagine the final sound of a piece.
d) Improvisation skills.	Indirect	During the process of immersion in a mix, many ideas about the creative musical process can be triggered.
2. Cognitive skills:		
a) Music reading.	Direct	During the use of DAW in the mixing process, it is often necessary to make settings referring to elements of musical theory. For example: adjustments to the grid by musical figures, tempos, bar formulas, and key signatures.
b) Transposition.	Indirect	Same as above.
c) Understanding of tonalities.	Indirect	Same as above.
d) Understanding of harmony.	Indirect	Same as above.
e) Understanding of the structure/form of music.	Direct	In mixing, one of the possible steps in a DAW is to mark the parts of the music, the musical form, to perform a more conscious mix, considering specific sounds for each part of the piece.
f) Memorization of music.	Direct	The process of active listening during the mix is so intense that many musical elements are naturally memorized.
g) Composition.	Indirect	During the process of immersion in a mix, many ideas about the creative musical process can be unleashed.
h) Understanding of different musical styles and their cultural and historical contexts.	Direct	It is essential to listen to and know phonograms in various musical styles for a good mix.
3. Technical skills:		
a) Instrument-specific skills.	Indirect	Actively listening to performances during a mix can generate learning in the musician, which is useful for future performances.
b) Technical agility.	None	

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c) Articulation.	Indirect	Aspects of articulation of musical notes can be altered by sound effects processing. Thus, the mixer ends up reflecting on this aspect of musical technique.
d) Expressive sound quality.	Direct	While the instrumentalist or singer searches for sonic expressiveness in the recording, the mixer uses the mixing resources for the same element.
4. Musicianship skills:		
a) Ability to play expressively.	Indirect	During active listening in mixing, the musician can understand some expressive elements that can be extrapolated to their performances as a performer.
b) Ability to project sound.	Indirect	Same as above.
c) Developmental control.	Indirect	Since mixing is an act that is recorded as a phonogram, the person mixing can monitor its development by comparing the mixes they have done in the past
d) Convey meaning.	Direct	The sound scene transmitted by the mixer is loaded with meanings, for example, the intensity of the voice, the amount of reverb used, etc.
5. Performance skills:		
a) Ability to communicate with an audience.	Direct	In the act of mixing, the musician performs direct communication with his audience that, with the new means of communication provided by the Internet, has become a two-way street.
b) Communication with other performers.	Direct	Through the mix and mix distribution process indicated for the https://discussion.cambridge-mt.com/ forum, direct communication with other artists in the mix is possible.
c) Ability to coordinate a group.	Indirect	In a real mix process, there is often the participation of several professionals, including music producers, instrumentalists, and vocalists participating in the project. In this way, skills related to this aspect can be exercised.
d) Performing to an audience.	Direct	When mixing, the musician communicates directly with his audience, which has become a two-way street with the new means of communication provided by the Internet.
6. Learning skills:		
a) Ability to learn, monitor, and evaluate progress independently.	Direct	The dynamics indicated in this article of systematically using the Cambridge Music Technology repository for mixing, posting, and comparing allows the establishment of a history of mixes, providing this ability.
7. Life skills:		
a) Social skills (being able to work with other musicians, promoters, and audiences).	Direct	Certainly, the mixer has to deal with various other professionals in his professional work, and these social skills are very well developed.
b) Planning and organizational skills (planning practice schedules, programs, travel arrangements).	None	
c) Time management (being punctual, meeting deadlines).	Indirect	As mixing demands organization in time, it can indirectly be a skill to be developed in this process.

Source: Prepared by the authors

Table 2, in turn, presents the relationship of mixing to the knowledge indicated for American K-12, according to Joseph (2011).

Table 2 - Suggested correspondence between K-12 musical knowledge/skills and mixing process

Skill/knowledge	Correlation with the mixing process	Comment
1. Elements:		
a) Musical tempo	Direct	In the mix, it is important to explore rhythmic accuracy, especially for tempo marking, which is important in the case of delays.
b) Rhythm	Direct	In the mix, rhythm is considered in many ways, including those necessary for the use of delays.
c) Pitch	Direct	During active listening, which is natural to the mixing process, the observation of pitch is developed. Thus, one can benefit from improving performance by enhancing one's listening. Furthermore, when adjusting equalization, this perception is fundamental.
d) Melody	Direct	Identifying which track among several similar ones has the main melody is very important and usual in the mix.
e) Harmony	Indirect	The mixer indirectly exercises harmonic knowledge due to the active listening to which he is subjected.
f) Texture	Direct	It deals precisely with the musical texture from the various audio tracks expected in a mixing activity. The texture is achieved by volume, pan, equalization, reverberation, etc.
g) Timbre / tonal color	Direct	Timbre is constantly considered during a mix, especially in equalization processes.
h) Form	Direct	The mixer must consider the musical form to create different sound characteristics for the different parts of a musical work.
i) Expression (dynamics, style, tempo, phrasing)	Direct	Just in terms of dynamics, expression is often worked on in a mix.
2. Fundamentals:		
a) Elements	Direct	Elements of music theory can be exploited in the mixing activity to adjust some parameters of the DAW.
b) Notation	Direct	Elements of musical notation can be explored in the mixing activity to adjust some parameters of the DAW.
c) Composition	Indirect	During the process of immersion in a mix, many ideas about the creative musical process can be triggered.
d) Improvisation	Indireta	Same as above.
e) Genres / Historical periods / Styles / Cultures	Direct	It is essential to listen to and know phonograms in various musical styles for a good mix.
f) Vocal and instrumental performance	Indirect	Listening to the performances during a mix can generate useful learning for the musician for future performances.
g) Audience	Direct	In the act of mixing, the musician communicates directly with his audience, which, with the new means of communication provided by the Internet, has become a two-way street.
3. Skills/Techniques:		
a) Active listening	Direct	This is the most exploited skill in a mixing activity, the human skill that makes mixing possible.
b) Musical reading	Indirect	Elements of music reading practice can be exploited in the mixing activity to adjust some parameters of the DAW.
c) Performance	Indirect	Actively listening to performances during a mix can generate useful learning for future performances.
d) Composition	Indirect	During the process of immersion in a mix, many ideas about the creative musical process can be sparked.

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e) First sight reading/solfeggio	Indirect	Elements of music reading practice can be exploited in the mixing activity to adjust some parameters of the DAW.
f) Playing instruments	Indirect	Active listening to performances during a mix can generate useful learning for future performances in the musician.
g) Singing	Indirect	Same as above.
h) Improvising	Indirect	During the process of immersion in a mix, many ideas about the creative musical process can be triggered.
i) To conduct	Direct	In the broad sense, the act of conducting (directing the performance of a musical group) is linked to the act of mixing. Conducting is like mixing live. In this way, mixing can provide maturity for a conductor to imagine their musical group's sound and seek to achieve it.

Source: Prepared by the authors

Conclusion

At the end of this article, it can be seen that he has presented software (Cakewalk by BandLab) and repository (Cambridge Music Technology) resources as enablers of mixing practices by anyone interested. Furthermore, he presented a range of skills and knowledge that can be enhanced through mixing. Considering the direct and indirect benefits, as proposed, almost all musical skills are supported by mixing.

The following list presents a summary of the skills and knowledge directly worked on in a mixing process, according to the concatenation of the data in Tables 1 and 2:

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1. Ease of knowing how the music will sound before you play it.

2. Understanding of the structure/form of the music.

3. Memorization of the music.

4. Understanding of different musical styles and their cultural and historical contexts.

5. Expressive quality of sound.

6. Conveying meanings.

7. Ability to communicate with an audience.

8. Communication with other performers.

9. Performing to an audience (not in person).

10. Ability to learn, monitor, and evaluate progress independently.

11. Social skills (being able to work with other musicians, promoters, and audiences).

12. Conducting skills (not the conducting movements, but the awareness of the desired sonority).

13. Active listening skills.

14. Knowledge of Musical tempo, Rhythm, Height, Melody, Texture, Timbre/tonal color, Shape, and Expression with dynamics.

The present paper is limited because it is based only on literature reviews and suggested correlations between musical skills/knowledge and mixing practice. In future research, confirmation and scope of the suggested benefits of mixing for each indicated musical skill/knowledge can be sought. In other words, corroboration of tables 1 and 2.

For music teachers who wish to use the mixing process with their students as a didactic resource, we indicate here a proposal for an activity script:

a) Research on the internet about the characterization, historical development, and main exponents of such a musical style is available in the Cambridge music technology library.

b) Listen to some videos or audio with phonograms of this style.

c) Search the website[16] for a piece of music in this style.

d) Mix this piece.

e) During the mix, discover the following aspects of the piece: time signature, tempo, musical form, instrumentation in each part, details of the arrangement (rhythmic base, types of background, etc.), timbre characteristics of each instrument and its approach used in the mix (equalization, compression, etc.), description of the volume ratio between the various soundtracks and the ambiance proposed by the reverberation.

f) Share your work on the forum, enjoy other people's mixes, and comment on them.

We conclude this article by emphasizing that, during a mixing process, the student needs to exercise his perception and knowledge of all the aspects listed above. In other words, the mixing process represents an interesting field for the music teacher and a new didactic tool for the music student. When the student comes into contact with the raw material of other people's musical production, a series of opportunities for musical growth opens up. There are more direct ways to teach most of the musical skills presented in Tables 1 and 2 than the practice of mixing, but it is precisely this formal rigidity that is broken by this more active approach to learning.

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ABOUT THE AUTHORS

Glauber Lúcio Alves SANTIAGO

Universidade Federal de São Carlos (UFSCar), São Carlos – SP – Brasil. Professor at the Department of Arts and Communication. Doctoral degree in Production Engineering.

Caroline Torkomian JOAQUIM

Universidade Federal de São Carlos (UFSCar), São Carlos – SP – Brasil. Undergraduate teaching degree in Music Education.

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