

Movement and Posture During Marimba Performance: Marimba Works' Analysis and Composition of Technical Exercises

Movimento e Postura Durante a Performance da Marimba: Análise de Obras para Marimba e Composição de Exercícios Técnicos



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Abstract: This article presents ongoing research reflecting the importance of movement and posture during marimba performance and how these aspects can be improved. It also seeks to develop educational material for the marimbist with a focus on creating movement and posture skills, through the analysis of advanced works for marimba. Starting from a literature review in the area; practice of specific marimba works; as well as the results of purposefully created educational material (etudes based on Brazilian and German popular songs), we propose possibilities of movement and posture for the marimbist during his/her performance. Some partial results were achieved, such as the composition and testing of most of the material developed - two of these examples are discussed at the end of this article. With this work, we hope to contribute to the literature on existing methods for marimba, as well as the publication of the original musical material to allow accessibility to the largest possible number of marimba students and performers.

Keywords: Marimba; Movement and posture; Musician's health; Marimba works.

Resumo: Este artigo apresenta investigação em curso que reflete sobre a importância do movimento e postura durante a performance de marimba e como esses dois aspectos podem ser aprimorados. Procura-se também desenvolver material didático para o marimbista com enfoque no desenvolvimento de habilidades de movimento e postura, através da análise de obras avançadas para marimba. Partindo de uma revisão bibliográfica na área; prática de obras específicas de marimba; bem como dos resultados do material didático propositadamente criado (estudos baseados em canções populares brasileiras e alemãs), propomos possibilidades de movimento e postura para o marimbista durante a sua performance. Alguns resultados parciais foram alcançados como a composição e teste da maior parte do material didático desenvolvido - sendo dois desses exemplos abordados no final do artigo. Com este trabalho esperamos contribuir para a literatura de métodos existentes para a marimba, bem como a publicação do material musical original de forma a permitir a acessibilidade a maior número possível de alunos e performers de marimba.

Palavras-chave: Marimba; Movimento e postura; Saúde do músico; Obras para marimba.

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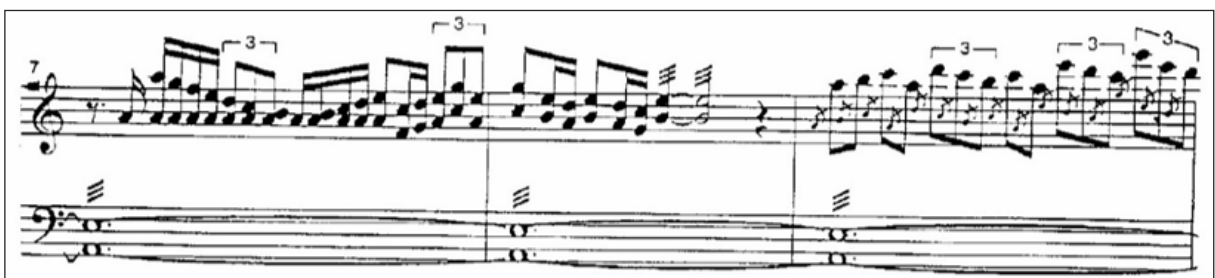
1. Introduction

This article is a cutout of a work in progress about movement and posture during marimba performance. The elaboration of pedagogical material to develop and improve the movement and posture of the percussion student is the main goal of this work. The methodology for such goals is the analysis of the learning process of selected repertoire for marimba that demands attention to the performer's body movements and postures, using the results of such experience, together with found literature about body movement and posture focused on music performance area, to compose educational material for future percussion/marimba students to help them develop their skills on what's related specifically about their body consciousness.

When searching for literature on the subject "movement and posture in music performance", especially on the percussion field, I realized that there were very few methods on such subject for percussion keyboards, especially for the marimba, which is an instrument that demands much more movement and, consequently, will be more prone to delight the audience with more visual gestures (Colton, 2013) and has a considerable large dimension, having a 5-octave model reaching around 2,5 meters and 1 meter wide (Lin et al., 2017). One of the most important methods ever written for the development of the four-mallet technique – and one that holds true not only for marimba but for all percussion keyboards – is Leigh Howard Stevens' *"Method of Movement for Marimba"* (2005). It presents, basically, two chapters: an introductory and a theoretical one, in which he briefly explains about permutations of strokes with four mallets, describes the possible techniques of four mallets, and clarifications the movement of the mallets before, during, and after the strokes; and a second chapter, with more than 500 short technical exercises that gradually work out such possible permutations of strokes with four mallets.

Depending on the repertoire to be worked on in the marimba, it is essential that the percussionist pay close attention to the issues of movement and posture during his/her studies, as this can influence and even facilitate musical performance. For example, in the second movement of Rosauero's "*Concerto no 1 for marimba and orchestra*", the marimbist must perform an independent roll on the left hand by playing the notes A2 and E3 while performing other musical phrases with the right hand in the first session of the movement (see example 1). The issue of the posture in the musical performance is made here important, for example, on bar 9, in which the percussionist continues to keep the independent roll on the left hand and must perform phrases that involve notes of the highest octave of the marimba. By observing several recordings of this concert, it is possible to perceive that several interpreters perform this passage in different ways when we observe, for example, only the postures they chose. Here, however, we propose a study in which we defend the appropriate postures to be used in such examples and explain – from a basic anatomical point of view and based on solid literature – why such postures may be the best options.

Example 1. Bars 7-9 of the second movement of the "*Concerto no 1 for Marimba and Orchestra*", by Rosauero.



Source: ROSAURO (1986).

2. Studies about posture, gesture and movement in musical performance

In a study conducted by Shoebridge et al. (2017), which aims to develop an interdisciplinary theory of posture to contribute to the health and performance of musicians, participants involved in the research, presented similar definitions of what they think about

posture. They think of posture as something multidisciplinary that involves “cognitive, emotional, physical, situation-specific response” (p. 825). For the interviewees, the ideal posture allows a good performance through the least possible use of strain. In addition, posture was seen as something idiosyncratic, since it can be linked to different personal aspects, such as the ancestor and the physique of a particular person. With regard specifically to musicians, the ideal posture is fundamental so that it is possible to produce good sound quality.

Blanco-Piñeiro (2013) also brings several definitions of what are considered quality postures; in general, they are those in which the lowest levels of body tension are observed, which allows good freedom of movement of the limbs and that the naturalness of the spine is also observed. Regarding the specificities of each instrument, the author points out that the success of a good posture suitable for each instrument depends on three factors: a) stabilizing the lower extremities and leaving their joints loose; b) respecting the alignment of the spine and the head-trunk relationship; and c) upper extremities free to perform their functions to the instrument.

Still on Wong’s dissertation (2022), she wrote long research about the technique, showing in her literature review how Alexander Technique can ease pain, improve posture and movement, and contribute to people with Parkinson’s disease (in the sense that, after Alexander Technique sessions, they would feel less depressed and with better posture, balance and mobility), help on respiratory functions, and, of course, how it improves musicians’ performance and practice in general. She shows literature reviews about how the technique helped both students and professional musicians, improving their tone and breathing (for singers), improving posture, and reducing tension physically and psychologically (in this case, for flute students).

Regarding the influence of the interpreter’s posture in making music, Pierce (2007, p. 14-15) explains how paying attention to different muscles and postures can prepare the musician for better musical practice/execution. After an explanation about the different postures varying the curvature of the spine, both in the case of the

person sitting and standing and what should be paid attention to concerning the slight movements necessary to slightly move the body (attention to the knees, heels, and hip joints), Pierce says that the performer can receive a feeling of being better prepared for musical elaborations when performing a toned posture, stabilized, elevated and alive.

In a chapter dedicated to movement in the conjunctures found between musical phrases (e.g., antecedent and consequent phrases), Pierce (2007, p. 147) points out the importance of body awareness concerning joint movements, attention to a balanced posture when playing and a flexible spine. Therefore, the movements mustn't be concentrated only in the hands and arms, without an "insufficient contribution of the whole body at all levels of conjunctures", which can lead to an exaggerated communicative effect.

Two experiments conducted by Broughton (2008) are worth mentioning since they both involve the analysis of body movement and gestures of marimbists and their influence on the ratings of the public with two different playing manners: projected and deadpan (Davidson, 1993). The first experiment was conducted on laboratory conditions, i.e. there were no public performances involved (what Broughton left for her next, second experiment). In this first experiment, she had two marimba performers playing excerpts to 48 participants – half musically-trained and half not musically-trained – who had the task to rate the performances in levels of expressiveness and interest; it was revealed that participants could distinguish between performances with high levels of expressiveness and the opposite, and there was a significant difference between the ratings of musically trained participants and not musically-trained participants.

On Broughton's (2008) second experiment, this time she had a marimbist – in this case herself – performing the second movement of "*Two Mexican Dances*" (1977), by Gordon Stout, and she conducted this experiment with 23 participants that were present in the audience – all reported having normal hearing and normal or corrected vision, all were not familiar with Stout's piece

of music and only thirteen of them were musically trained – and they had a portable Audience Response Facility, which is a “palm-sized, rectangular, flat, hand-held computer” (Broughton, 2008, p. 93), with which they would rate the performance according to how engaged they were during Broughton’s performance, during which she would change her ways of performing (sometimes on projected mode, sometimes on deadpan mode). The results showed that participants rated mostly “engaged” during the projected moments than during the deadpan moments.

Colton’s thesis (2013) is one of the few research projects found that deals specifically with movement and posture during marimba performance. Initially, she introduces the reader to three essential chapters about the history of the marimba, the terminology related to her research (movement and gesture in performance), and how and why performers move. Her last chapter is about a research study she conducted in which she analyzed the body movements of ten percussionists to verify how different each marimbist would play. With a well-known recording and instruction-given methodology and after analysing each marimbist’s movements, comparing them with the other subjects, and collecting interview data which every one of them, she was able to conclude that they all tried to play without exaggerating their movements and with the economy of motion and that the style of the music might imply particular ways of moving and the listener might expect certain gestures.

Another study involving voluntary subjects for analysing marimba performance movements using motion analysis through use of reflective markers has demonstrated several interesting results. It has been stated that there was a noticeable posture difference between bachelor and master students, in which the former tended to lean more forward the marimba than the latter. Moreover, a gender difference in performance was ascertained, since most females showed to lean less forward towards the marimba than males, which is something the latter should eventually look out for since this could cause musculoskeletal injuries and other forms of pain. Finally, another worthy mention

conclusion was that personal aspects might influence sound production and movement, such as the mallet grip chosen as well as cultural and educational background (Lin et al, 2017).

The texts of Pierce (2007) and Blanco-Piñero (2013) might bring some questionable debate on the following subject: Pierce mentions that we should pay attention when playing with “a flexible spine”, but Blanco-Piñero says about respecting the alignment of the spine. We believe that any extreme situation should be left out of the topic, e.g. playing a violin with an exaggerated back-bent position or simply practicing scales on the marimba aware of your bent spine just because some author mentioned the importance of playing with a flexible spine. Here, as a musician, I believe it is safe to say that our normal educational/professional environment is not always 100% healthy – with so many hours of practice and sometimes standing/sitting on the very same posture/position. We believe both authors are right, in the sense of flexing our spine being to a certain point not only healthy but also in some practices encouraged (e.g. the already mentioned Alexander Technique), but at the same time maintaining and respecting its natural alignment, so that, e.g. after many hours of practice the spine doesn't risk getting damaged or hurt because the student/professional performed multiple and too frequent movements related to the spine.

In summary, the previous texts about analysis of body movements and gestures during percussion performance have shown how important it is for a percussionist to explore, think about, and convey his/her movements and gestures while playing, since what and how they play something might convey different messages for the public, and such messages are connected to the intentions of the musicians: larger and slow movements might be attached to a slow, melancholic piece, whereas a fast-movement and agitated sequence of gesture might be linked to a piece with more energy and notes to be played in a shorter amount of time.

3. Comments on posture for marimba works

Initially, several marimba works were selected to be studied and analysed, and such choices are related to the experience of

one of the authors (Misina) experience of learning them. The pieces are "*Etude in e minor*" (2006), by Pius Cheung (b. 1982), "*Etude in e minor*" (2011), by Casey Cangelosi (1982), "*Reflections of the nature of Water*" (1986), by Jacob Druckman (1928-1996), "*Velocities*" (1990), by Joseph Schwantner (1943), and the second movement of the "*Concerto No 1 for Marimba and orchestra*" (1986), by Ney Rosauero (1952). Here we would like to show our considerations about two of these works.

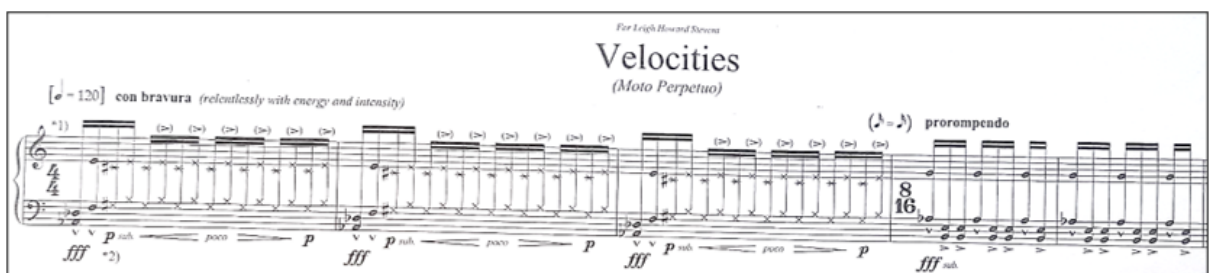
3.1. "*Velocities*" (1990), by Joseph Schwantner (1943)

This piece of music by Schwantner is one of the products of the 1986 National Endowment for the Arts Commission, a project that aimed for the development of new works for solo marimba. Fang (2005) brings a thorough background about this project with valuable information from interviews with some involved in this project, and so it has been mentioned in different past occasions (Cook, 1987; Ford, 1992).

Right in the beginning of "*Velocities*" the percussionist encounters fast 16th notes and needs to considerably move his/her body to keep changing from playing on the center and the edges of the bars; besides, Schwantner writes a quick *crescendo* and *decrescendo* (see Example 2), which demands more movement from the arms of the player, but not so much of the posture. About this, we show on photos 1 and 2 how we thought about an ideal posture for the first three bars. Changing from playing on the center to playing on the edge demands using the handles of the mallets, and for that intending to keep and respect the alignment of the spine-neck connection (Blanco-Piñeiro, 2013), we demonstrate how that's achieved through flexing of both legs, thus sustaining the upper-body with the strength of the knees and feeling an increase of firmness of the plant of the feet. It is possible to observe in photo 2 that the body stays on a diagonal line reinforced by the right leg; this happens due to the fast change from playing on the edge of the bars with the mallets' handles to going back to playing on the upper surface of the bars, but on the right hand the player has to play the major 7th interval of Ab-G. It was considered the

possibility to play on the center of the Ab bar, but since this would lead to a greater movement of the body, playing on the edge of the bar, in this case, seems a better solution, especially because the composer writes *fff* with an accent, which makes the presence of the interval wider, compensating for the lack of tone quality of playing on the edge (Beck, 2013).

Example 2. Bars 1 to 5 of "Velocities".



Source: SCHWANTNER (2007).

Photo 1. Position for the first two 16th notes of bars 1 to 3 of "Velocities".



Source: author (2024).

Photo 2. Changing of posture from bar 3 to bar 4 of “Velocities” (2007).



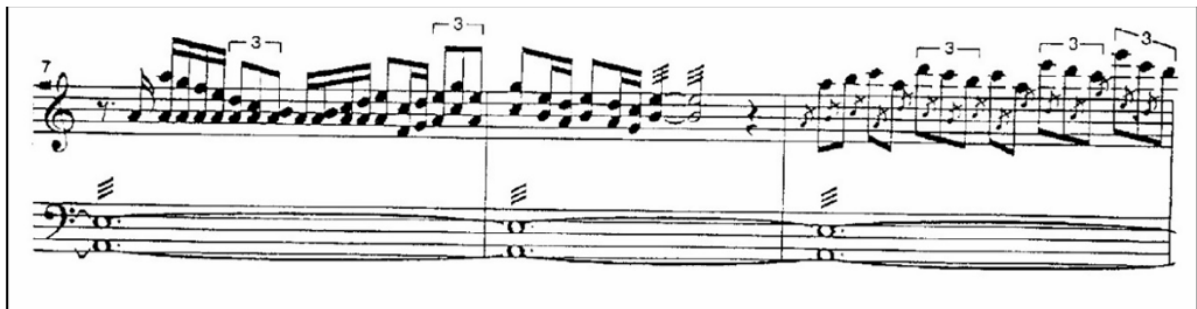
Source: author (2024).

3.2. “Concerto No. 1 for Marimba and Orchestra” (1986), by Ney Rosauro (1952), mvt. II. Dance

Right on the first section of the movement, approaching the end of it, we see from bar 9 that the percussionist has to keep playing the independent roll on the left hand on notes A2 and E3

and has to play on a quite far and high register of the marimba. The highest note to be played on the right hand is the G6, while maintaining an octave opening on the mallets of the right hand to keep executing the grace notes one octave lower below the real notes on the high register. This, added to the left-hand independent roll, causes a widening of the arms and poses the question: how could one perform such a passage better and with more stability and control over the body?

Example 3. Bars 7-9 of the second movement of the "Concerto no 1 for Marimba and Orchestra", by Rosauro.



Source: ROSAURO (1986).

Having in mind the previous repertoire and the solutions proposed, we came with a solution here that is based on similar ideas. For this passage we have to consider the change of postures that happen before and after bar 9. The photos 3 and 4 below show an example of a comfortable position in which one can play the beginning of the movement until bar 9 without major problems and discomfort. Notice that the body is comfortable, stable and the alignment of the back and head are respected (Blanco-Piñeiro, 2013).

Photo 3. Side view of a possible posture for the beginning of the 2nd movement of "Concerto no 1 for Marimba and Orchestra" until bar 9.



Source: author (2024).

Photo 4. Front view of another possible posture for the beginning of the 2nd movt of "Concerto no 1 for Marimba and Orchestra" until bar 9.



Source: author (2024).

The change of posture suggested here brings the percussionist the possibility to maintain the same posture alignment by moving the right leg to the right side and slightly flexing the knees, which will help keep the alignment of the spine-head combination (see photos 5 and 6). As for this slight flexing of the knees, one may observe in photo 6 how it slightly changes from the beginning of bar 9 – where this posture should be already happening – to the climax of the phrase (playing the G6 above). Furthermore, the flexing of the knees and the down-bringing of the whole body in order to maintain the alignment of the spine with the head brings the chance to avoid playing with the pointy area of the mallets, which in this case would reduce the volume need to be extracted out of the bar; playing with the middle region of the mallet – which with our recommended posture is possible and comfortable to execute – would enable the percussionist to reach the climax of the phrase with precision and the desired control of dynamics. Photos 7 and

8 show how the spinal cord alignment gets compromised when we firm our feet on the ground and don't give that extra step to the right with the right leg and, consequently, when we don't bring our whole body slightly down (like previously showed). Notice on photo 7 how the whole trunk of the body bends – almost even 45 degrees – to the right side and in photo 8 how the feet don't change places, which causes, as mentioned above, the curvature of the whole upper body part.

Photo 5. Front view of a posture for the beginning of the 2nd movement of "Concerto no 1 for Marimba and Orchestra" when starting the play bar 9 (upper photo) and when hitting the highest note (G6, lower photo).



Source: author (2024).

Photo 6. Front view of a posture for the beginning of the 2nd movement of "Concerto no1 for Marimba and Orchestra", by Ney Rosauero, when starting the play bar 9 (left) and when hitting the highest note (G6, right).



Source: author (2024).

4. Composition of educational material: *etudes* composed

Our work's idea is to contribute to the literature of percussion methods and books with technical exercises and *etudes* that focus on the development of movement and posture during the marimba performance. To do that we thought – for the technical exercises – about experimenting on existent methods for mallet instruments, i.e. not only what's existent for marimba but also for vibraphone, xylophone, etc. For the composition of the *etude* the source material was folk songs from Brazilian and German culture. The idea of using such source material was to give credit to such rich

and valuable artistic forms. Among so many different options, we used certain criteria for the selection of the songs, mainly focusing on the diversity of time signatures, tonality, tempo, and quantity of source material available for purposes of contextualization of each song. Moreover, the composition of the *etudes* followed mostly the pattern introduction of the main melody with a simple accompaniment plus further variations with different textures and compositional ideas. For the Brazilian folksongs, we used Paz's folksongs book (2010) and for the German folksongs, the one by Rölleke & Medek (1993).

Photo 7. Front view, compromising of the spinal cord's alignment.



Source: author (2024).

Photo 8. Side view; feet on the ground without stepping to the right with the right leg.



Source: author (2024).

It is important to note that the development of this material was thought in the researcher's footage and can be applied and adjusted for students with different heights and measurements, provided that any signs of discomfort are always observed; in such cases, we recommend that the practice should be stopped immediately. On this topic, it has already been shown that participants with highly different heights were able to show similar lower body movements during the execution of selected music excerpts (Colton, 2013).

At present several technical exercises were already composed, and some other *etudes* also had their compositional processes ended. Here we would like to show some bars of them and show how their compositional processes are linked to the development of movement and posture during marimba performance.

4.1. "É tarde, ela dorme"

"É tarde, ela dorme" is a traditional song from the state of Maranhão, northeastern Brazil. According to Vaccari (2019), "É tarde, ela dorme" is a "modinha", a musical genre that, together

with another one called “lundu”¹, has been following Brazilian and Portuguese music history for a long time.

Our arrangement based on “*É tarde, ela dorme*” consists of three variations: I, Dolce, II, Lacrimoso, and III, Tranquilo). Var. II, Lacrimoso was written to be played with rolls², except when eight notes appear – carrying a more present melodic aspect; here the challenge is to think and study the postures needed to play the right notes and the singularities of the postures depending on the four-mallets technique used by the player. A significant challenge regarding posture-thinking might be achieved if most notes are to be played on the center of bars, e.g. on the right hand from bars 33 to 37 (see Example 4): in this case, on the left hand the D flat played on the centre would be a hard task, but the keeping of mallet three on the B flat might bring some interesting posture development; by doing so, we believe we are reinforcing the idea of how important it is to have in mind that, during our daily music-making process, we keep are lower extremities stable, that we respect our head-truck relationship and that we keep the natural alignment of our spine (Blanco-Piñeiro, 2013).

Example 4. Bars 33 to 37 of the arrangement of “*É tarde, ela dorme*” by Guilherme Misina.

(roll all notes, except on 8th notes)

33

mf

Source: author (2024).

¹ The history of both genres is related to the Portuguese expansionism and the term “modinha” starts gradually to appear in the musical and poetical literature around the last quarter of the 18th century (Lima, 2010). The song is written on F minor and its lyrics are about a woman who lives on the streets, and has apparently nothing left (“o seu leito é a rua” means “your bed is the streets”, “Os raios da lua, o seu rosto cobria” means “your face was covered by Moon’s light”).

² When the percussionist plays repeatedly the same notes in order to sustain it, something similar to a violist bowing a note continuously or a snare-drum player performing a drum roll.

Finally, on Variation III, Tranquilo, the idea was to work on the movement/pacing from one register to another, keeping long phrases that go from a high register, end on the low register, and movement slightly upwards to certain middle-register notes. Also, the compositional method of this last variation was about using a whole-tone C#-D# scale in the beginning, moving to C-D scale on the second beat of bar 49, and finishing – from bar 59 on – with the idea of a predominantly major third.

Example 5. Bars 48 to 59 of the arrangement of “É tarde, ela dorme” by Misina.

Source: author (2024).

4.2. “Oh, wie kalt ist es geworden”

A second *etude* has been composed based on the German folksong called “Oh, wie kalt ist es geworden” (“Oh, how it has become cold”³). As in “É tarde, ela dorme”, this *etude* consists of three variations of the original theme, and below we show the last five bars of it.

³ Composed by Heinrich Hoffmann in 1835, and its melody resembles Mozart’s “Sehnsucht nach dem Frühlinge, K. 596” (text by Christian Adolph Overbeck).

In the marimba repertoire, it is quite common to find melodic and rhythmic patterns found in Example 6 below, because not only it's a great source of composing with a melody-accompaniment idea (by leaving e.g. the left hand in the low register for accompaniment and the right hand for melody), but this also goes back to the roots of four-mallet learning-process, i.e. practicing the different sticking alternating combinations (e.g., 1-2-3-4, 1-2-4-3, 1-3-2-4 etc.). Here, however, we thought about spreading the arms in a way that the student can practice his/her posture by playing on registers of the marimba far apart from one to another. Having the D2 as the lowest note on bar 61 and simultaneously keeping the farthest mallet on the right hand on a Bb5 can be quite a split for some percussionists. It might even bring some challenges if one opts for playing on the center of the bar, which requires a slight bending of the right arm.

Example 6. Bars 60 to 64 of the arrangement of "Oh wie kalt ist es geworden", by Misina (original lied by Hoffmann).

The musical score for Example 6 consists of two systems of piano accompaniment. The first system covers bars 60 and 61. The right hand plays a melody with accents and a slur over bars 60-61. The left hand plays a bass line. The second system covers bars 62, 63, and 64. Bar 62 is marked 'Rall.' and 'mf'. The right hand continues the melody with accents and a slur over bars 62-63. The left hand continues the bass line. The piece concludes with a final cadence in bar 64.

Source: author (2024).

With this section we expect the student to improve his/her specific abilities to think about what the best posture for playing this passage is, i.e. how he/she must think about standing concerning the marimba and how his/her arms and legs must be positioned to not only play passionately and the right notes, but also conscious about the details of the body that enables a relaxed and comfortable playing position (Pierce, 2007).

CONCLUSIONS

Understanding how a musician's body and posture might influence the quality of his/her sound or even his/her future health conditions is, for us, of a high level of importance. Having this literature in mind and as a background to the development and analysis of the selected marimba repertoire has been of importance that led to the precise point, we knew we had to focus on while composing the *etudes* and technical exercises, i.e. this new material is, in essence, the result of the combination of the literature review and the results of the studying, practicing and analysing process of the selected works with marimba.

Our work is on its final steps, having all the planned marimba solos studied and with the pertinent details about their peculiarities in posture and movement noted. This was enough for going further with the composition of the *etudes* and the experimenting and creation of the technical exercises focused on the improvement of skills related to posture and movement for undergraduate and graduate students. With the literature about body consciousness, posture and movement in the music performance field we hope to show the reader(s) that not only this subject is vital for a good and healthy musical performance life/career, but also that having this kind of knowledge in mind before, during, and after performances might even facilitate our learning and performing processes. Going through this learning process of the previously mentioned marimba works surely helped give the necessary background and pointers for us to know how to compose the exercises and *etudes* to focus on the movement and posture skill development.

With the composition of the *etudes* and the technical exercises we expect to contribute to the existing – yet still scarce compared to other musical instruments – literature for the percussion area, in this case, focused on the development of the four-mallet marimba player (regardless if he/she is an undergraduate or graduate student), for example on “*Velocities*”, when we point out the necessary attention needed for the player’s posture and movements right on the very first bar by changing the posture when playing on the center and the edges of the bars, watching out for the player’s knee bending and back’s alignment (Blanco-Piñeiro, 2013). Another example is regarding the playing of Rosau’s Concerto, in which the marimbist can play the octaves from bars 7-9 more comfortably by stepping slightly to the right with his/her right foot to not bend the upper body concerning the lower body, thus watching out for the different possible muscles and postures that can be used for better performance (Pierce, 2007). In further research, we plan to publish the *etudes* and exercises separately from the academic texts – although reading them and having them in mind before the studies of the musical material are of absolute importance for those who wish to have a deeper understanding of the subject in question.

REFERENCES

BECK, J. **Encyclopaedia of percussion**. Routledge, 2013.

BLANCO-PÍÑEIRO, P. **La calidad de la postura corporal durante la ejecución musical: un estudio con alumnado del conservatorio superior de música de Vigo** (Doctoral dissertation, Didácticas especiais). 2013.

BRODSKY, W., & SLOBODA, J. A. Clinical trial of a music generated vibrotactile therapeutic environment for musicians: Main effects and outcome differences between therapy subgroups. **Journal of Music Therapy**, 34(1), 2-32, 1997.

BROUGHTON, M. **Music, movement and marimba: Solo marimbists' bodily gesture in the perception and production of expressive performance.** University of Western Sydney (Australia), 2008.

BROUGHTON, M., STEVENS, C. Music, movement and marimba: an *investigation of the role of movement and gesture in communicating musical expression to an audience.* *Psychology of Music*, vol. 32(2), p. 137-153, 2009.

CANGELOSI, C. **Etude in e minor**, Casey Cangelosi ©, 2011.

CHEUNG, P. **Etude in e minor**, Pius Cheung ©, (2006).

COLTON, M. **Typologies of Movement in Western Percussion Performance: A Study of Marimbists' Gestures.** Doctoral dissertation. University of Toronto (Canada), 2013.

COOK, G. 1987. Jacob Druckman's Reflection on the Nature of Water. **Percussive Notes**, v. 25, n. 4, p. 18, 1987.

DAHL, S. The playing of an accent—preliminary observations from temporal and kinematic analysis of percussionists. **Journal of New Music Research**, 29(3), p. 225-233, 2000.

DAHL, S., FRIBERG, A. Visual perception of expressiveness in musicians' body movements. **Music Perception**, 24(5), p. 433-454, 2007.

DRUCKMAN, J. **Reflection on the Nature of Water**, Boosey & Hawkes, (1986).

FANG, I-Jen. **The 1986 National Endowment for the Arts Comission:** an introspective analysis of two marimba works, Reflections on the Nature of Water by Jacob Druckman and Velocities by Joseph Schwantner, together with three recitals of selected works by Keiko Abe, Christopher Deane, Peter Klatzow, Wayne Siegel, Gitta Steiner, and others. Denton, 2005. 74 f. Doctorate dissertation. College of Music, University of North Texas, Denton, 2005.

FORD, M. Review of Reflections on the Nature of Water, by Jacob Druckman, **Percussive Notes**, vol. 30 no. 6 (August 1992): 71.

LIMA, E. V. **A modinha e o lundu: dois clássicos nos trópicos**.
Doctorate dissertation. Universidade de São Paulo, 2010.

LIN, C., HALLEMANS, A., VERMEERSCH, N., MICHELS, S., TRUIJEN, S.,
WILLOX, Y., VERWULGEN, S. Biomechanical characterization of marimba
playing in relation to the strength of sound. **International Journal of
Music and Performing Arts**, 5(1), p. 29-41, 2017.

PAZ, E. **500 Canções Brasileiras**. 2 ed. Brasília, Brasil, MusiMed, 2010.

PIERCE, A., PIERCE, R., P. **Expressive Movement**: posture and action in
daily life, sports, and the performing arts. Perseus Publishing, 2002.

ROSAURO, Ney. **Concerto nº1 for marimba and orchestra**, (Pro
Percussão), (1986).

RÖLLEKE, H., MEDEK, T. **Das Volksliederbuch**. Kiepenheuer & Witsch,
Köln, 399p, 1993.

SHOEBRIDGE, A., SHIELDS, N., WEBSTER, K. E. Minding the Body: An
interdisciplinary theory of optimal posture for musicians. **Psychology
of music**, 45(6), p. 821-838, 2017.

SCHWANTNER, Joseph. **Velocities**, (Schott Helicon Music Corporation),
(1990 (2007)).

STEVENS, Leigh Howard. **Method of Movement for Marimba, with
590 exercises**. 6th Printing, substantially revised and expanded; 25th
Anniversary Ed. Asbury Park, NJ: Keyboard Percussion Publications
by Marimba Productions, 2005.

VACCARI, P. R. A Modinha em Villa-Lobos: uma análise etnomusicológica
de três modinhas do compositor. **ANAIS DO V SIMPÓSIO VILLA-
LOBOS**, p. 66-91, 2019.

WONG, G. K. **Posture During Piano Performance:** Variability and Postural Changes Following Training in the Alexander Technique. Doctoral dissertation, Université d'Ottawa/University of Ottawa, p. 228, 2022.

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