Koninklijk
Conservatorium
Den Haag

Intention-based Piano Pedagogy

Syllabus for piano methodology

Part 1 – General approach

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INTRODUCTION

Piano lessons may involve various musical activities: ear training, sight-reading, keyboard harmony, improvisation, working on compositions by pupils, arrange (pop) songs for the piano, song accompaniment based on chords, to name a few. Guiding pupils towards improvement of their pianistic skills is a central activity in piano lessons. Pupils need our help in improving the quality of their piano playing. We have trained ears that quickly identify which aspects of their playing can be improved. On top of that, we have been in their position, having had to learn or improve certain pianistic skills, and therefore know how this can be approached. Piano teachers vary a lot in their strategies for achieving pianistic quality in their pupils.

This syllabus is written as reference material for the piano methodology course in the Royal Conservatoire in The Hague and Codarts University of the Arts in Rotterdam. It contains practical examples of how you can work with pupils on common aspects of pianistic quality, such as articulation, dynamics and pedalling. In conjunction with this, it also includes information about how the nervous system brings about movements ("motor control") and how people learn skills that involve both perception and movement ("perceptual-motor skill learning"). Knowledge and understanding of the processes that take place within your pupil whilst playing and learning/improving pianistic skills helps you to identify which type of assistance your pupil needs.

Hopefully, this syllabus stimulates an exchange of ideas between you (the students) and me (the teacher), causes you to think about your ideas *behind* your actions as a teacher and triggers your creativity to come up with your own applications of the presented information. My aim is to provide you with practical, applicable ideas how to approach pianistic quality in your own (internship) lessons, and at the same time give you the space to apply the presented information in your own way, in accordance with your personal (pianistic) preferences.

Pianistic quality is inseparable from posture and movement. **The central idea of intention-based learning is to treat musical intentions, listening and movement as a unity**. To isolate movements from musical intentions and listening is (in my opinion and experience) very unproductive. This syllabus is intended to show how to deal with musical intentions, listening and movement holistically. Learning and improving pianistic skills can take place much more effectively when pupils have clear ideas of how they would like the piece and the piano to sound. Also, the ability to distinguish (by ear) between different sounds/musical outcomes is essential in the learning process of pianistic skills.

We all have different pianistic backgrounds: we were taught by different teachers with different approaches. As a result, we all have different preferences ("tastes") regarding exercises, instructions, articulation, pedalling and even on how the piano should sound. The goal of the piano methodology (KC) and MEB (Codarts) courses is to learn to translate *your ideas* regarding piano playing into effective piano teaching. In perception-based learning, we focus on how we can create *optimal circumstances* for learning pianistic skills. As you will see, scientific research into motor control and motor skill learning has resulted in valuable knowledge that can be applied to piano pedagogy, in order to optimize learning outcomes.

Teachers are most effective when they experience *freedom* in choosing approaches that they *trust*. This is strongly influenced (among other things) by the piano lessons you have had in your life. The

internship is an opportunity to try out approaches that might be new for you and find out how you can apply them in a way that suits you.

This syllabus consists of two parts. Part 1 of the syllabus (this booklet), presents an over-arching vision on the pedagogical approach to posture, movement and pianistic quality. It starts with an introduction of the concept of intention-based learning. Chapter 2 explains how the nervous system brings about movements based on intended outcomes: intentional movements. In music making, the production of intended musical outcomes is the goal of one's actions. Therefore, the musical intentions that (non-consciously) underly musical actions ("musical imagination") are discussed in chapter 3. A model for music making is presented, in which musical imagination is the central point of the process. Consequently, this model is used as a tool for analysing what type of help a pupil needs in the learning process of a pianistic skill. Next, general guidelines for working on pianistic quality in a intention-based approach are given. In connection with the guidelines, pedagogical tools ("working forms") are described. The presented information is then summarized in a checklist for working on pianistic quality.

Part 2 consists of a large collection of practical approaches (exercises, in-between steps, helpful movement metaphors) for common aspects of pianistic quality, such as dynamics, articulation and pedalling. It is intended to serve both as a "toolkit" and as a "trigger" for developing your own application of intention-based learning.

I have used plural forms of words like *teacher* and *pupil* as much as possible, in order to avoid gender bias. When unavoidable, I have used the words *he* (instead of he/she), *his* (instead of his/her) and *him* (instead of him/her).

1 INTENTION-BASED LEARNING

Many years ago, I luckily witnessed a miniature double bass lesson in a corridor at the Royal Conservatoire of The Hague. A double bass student was practising in the corridor, due to the lack of practice rooms. One of the double bass teachers (Jean-Paul Evers[1], not the principal teacher of this student) passed by. The student approached the teacher and asked: "I am a jazz bass player and played only by plucking until recently. Now I am learning to play with a bow as well. Can you tell me how I should hold the bow?" The teacher's answer was very instructive:

> *I could send you to the library and let you examine some books on double bass playing. You will find many pictures and written instructions how to hold the bow. But that's not what we are going to do right now. We will let the instrument tell you what to do with the bow.*

Next, they did an exercise which involved laying the bow on the strings whilst *not* holding it conventionally. Rather, the bow was held between thumb and index finger at the extreme end of the frog. In this way, it was not possible to control the direction of the bow. Instead, the bow could only follow its natural trajectory over the string. The student had to produce a soft, long tone and was constantly listening to the tone, and feeling where the bow wanted to go. Several years later, I asked Jean-Paul Evers whether I could observe and record some of his lessons. He was kind enough to repeat the exercise described above with one of his students. You can see it here: https://youtu.be/LYH4rGUl42Y

Witnessing this miniature lesson triggered my thoughts. I noticed that in this approach to learning how to bow, *no instructions regarding "how to move"* were given by the teacher. Rather, the student was given a musical goal (to produce a long, soft tone) and had to *perceive:* he *listened* to the sound of his instrument and *felt* the natural trajectory of the bow. I started wondering several things:

- Can I apply this approach in piano teaching?
- Are there more examples of this type of approach to learning to play an instrument/sing?
- Is there (scientific) information about the effectivity of this type of approach?

During the following years, I found out the answer to these questions is "Yes": this approach is applicable to piano teaching, there are more examples of this approach in music and there is a surprising amount of scientific information that supports this approach. This syllabus describes how piano lessons can be based on musical intentions of pupils and activation of their perception (listening and feeling), both from a theoretical and a practical perspective.

To facilitate our communication about this topic, let's call the approach to instrumental teaching in which musical intentions of pupils play a central role intention-based learning. The approach in which instructions regarding "how to move" play a central role, we call instruction-based learning.

1 For more information about Jean-Paul Evers: http://www.snaarcontact.nl/

Please note that these concepts do not coincide with “good” and “bad” approaches. What matters is what “works”, both for you as a teacher and your pupil. If an approach is helpful, it is “good”, regardless of whether it should be classified as intention-based or instruction-based.

2 INTENTIONAL MOVEMENTS

2.1 PREDICTIVE PROCESSING

> *Interviewer: Tell us the secret of beautiful sound.*
>
> *Murray Perahia: I wish I knew. Pianists go into even books about sound production. And I tried to read these books and they're Greek to me, I don't know, about the level of the arm or the… I don't know, you probably have studied all of this. For me it's Greek. It's something in the heart and the way you hear the music that tells you how the sound is playing. The combination of the way you hear it and the way your heart tells you to hear it. For me there's no magic, it just comes straight through. I sometimes think about technique, but largely it's instinctive.*
>
> (Interview with pianist Murray Perahia by Arie Vardi *(Perahia)*)

Human beings possess the capacity to move intentionally: to move in such a way that intended outcomes are achieved. For example, a person intending to pick up a pen lying in front of him, will move his body, arm and hand in a gesture that accurately and effortlessly leads to the desired result. People are sometimes aware of their intentions and capable of expressing them verbally. However, they are largely unaware of the processes taking place in their nervous system that transform their intentions into actions. In music making, the production of intended musical outcomes is the goal of the activity. Musical intentions and corresponding auditory expectations of outcomes of musical actions initiate and guide motor control processes. Put differently, based on anticipations of intended musical sounds, the nervous system generates patterns of movement that lead to the production of them. Novembre and Keller (2014) explain this fundamental insight by means of the following example:

> *Let us take a basic example: striking a piano key with a finger. The movement (striking the key) is intended to generate a goal (a piano tone). When this is observed from the "outside" perspective of another individual, this phenomenon seems straightforward: the movement preceded its goal. However, when considering a "first person" perspective, it is the musician's intention (i.e., producing a piano tone) that leads the generation of a movement: moving the finger toward the piano key. This distinction might seem trivial, but in fact it represents a fundamental step to understanding that movements and their ensuing effects are intrinsically coupled in the human brain and in cognition. More specifically, a representation of a perceptual effect can trigger the movement necessary to produce the effect itself. (Novembre and Keller 2014)*

The idea that our actions are initiated and guided by our intentions is expressed in figure 1:

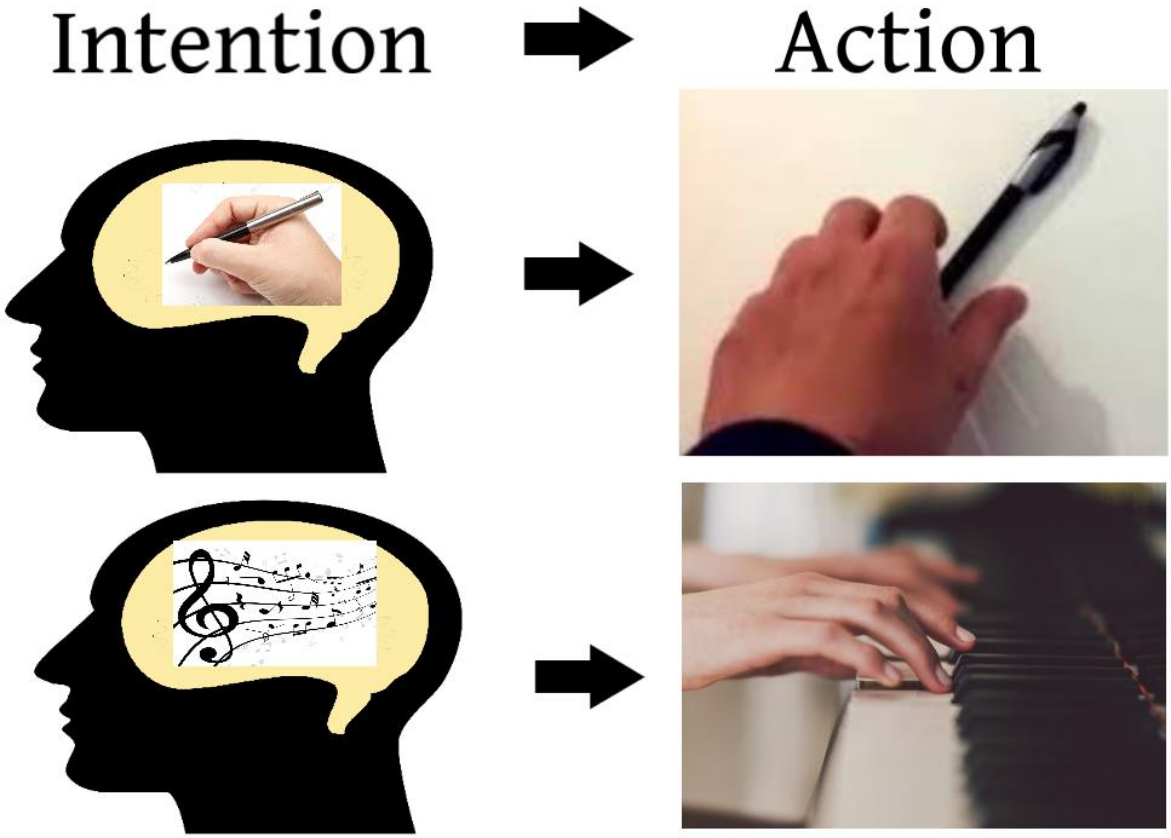


Figure 1 - Actions are initiated and guided by intentions. Created by the author.

Before initiating a goal-directed action, the individual must have a representation of the desired effect in mind and must use this representation to select a movement pattern that will successfully bring about this effect. This insight was first described by William James and has become known as the "ideomotor principle" (James 1890). Recent neuroscientific research has suggested that the nervous system achieves this transformation of intention into accurate motor control by means of predicting the sensory consequences of one's actions, a phenomenon known as predictive processing (Adams, Shipp and Friston 2013). Based on the intended outcome of the action, the brain continuously predicts the required movements and the sensations that will arise as a result of them. These predictions are based on previous experiences and implicit knowledge of our own body and the world around us. Implicit knowledge here refers to the individual not being aware of having learned it and not being capable of expressing it verbally, but demonstrating the knowledge indirectly via performance, also known as tacit knowledge (Harris 2017). Put simply, the brain "knows" how to affect the surroundings in order to achieve intended results, and which actions of the body are required, as a result of prior experiences. Prior to the initiation of actions and during their performance, the brain keeps readjusting its predictions, thus enabling accuracy and early processing of feedback that results from one's actions. The feedback that results from actions can be divided into exteroception, by which one perceives the outside world, and proprioception, which is the sense of the relative position of one's own parts of the body and strength of effort being employed in movement (Anderson, Anderson and Glanze 1994). Muscles, tendons and joint capsules are equipped with sensors that continuously keep the nervous system updated on muscle effort, the

force exerted on tendons, joint position and speed of movement.[2] Adams, Shipp and Friston (2013) have argued that the signals the brain sends down the spine in order to generate intended actions should be seen as predictions of the proprioceptive consequences of these actions. Classical reflex arcs at the level of the spine respond to these predictions by fulfilling them: they bring about changes in muscle length and joint position so that the actual proprioceptive signals match the predictions, thus producing the intended movements (Adams, Shipp and Friston 2013).

The effects of predictive processing can be seen in certain aspects of motor control in musicians. For instance, pianists have been found to perform wrong keypresses ("wrong notes") softer than correct keypresses. In conjunction with this, differences in brain activity connected to wrong or correct keypresses are observable already 100 milliseconds before keypresses are fully executed (Maidhof, et al. 2009). In practical terms, this indicates that pianists "know" they are going to play a wrong note a split second before playing it and even (non-consciously) try to mitigate negative consequences of the wrong note by playing it softer. This phenomenon is attributed to predictive processing in the pianist's brain, more specifically the detection of a mismatch between a predicted sensory consequence of an action and the intended action goal. It shows that the brain detects and corrects errors before movements take place and during the performance of musical actions. Put simply, our brain corrects most of our mistakes before they are made, thereby preventing them. Relying only on feedback (hearing and feeling) that arises as a result of one's actions would lead to error-rich performance. Based on our practical experiences we know that this is not the case: we are capable of fluent playing, which requires varying amounts of practice, depending on our level and the difficulty of the piece. Predictive processing enables musicians to benefit from feedforward: it allows them to plan accurate movements **before** feedback is available.

2.2 IDEOMOTOR LEARNING

In order to perform intentional actions successfully, the individual needs to "know" in advance what the consequences of a movement will be. As a result, voluntary action requires the ability to associate movements and their perceivable consequences. When individuals perform actions, they learn what the consequences of these actions are, a process known as ideomotor learning (Melcher, et al. 2013). The capacity for linking movements and their ensuing effects is inborn and is fundamental for motor skill acquisition in all stages of life (Hommel and Elsner 2009). Ideomotor learning happens spontaneously, in the sense that it does not require effort or attention of the learner. Moreover, it takes place non-consciously, as a result of self-organizing properties of the nervous system, i.e. the intrinsic tendency of the nervous system to improve its organization without an external control agent (Haken 2008). The process of self-organization that continuously takes place in the nervous system is like the organization that emerges in ant colonies when they construct an ant bridge: as a group, the ants exhibit smart, functional behaviour, even though there is not a single ant that has a clue about what they are doing. The cooperation between the ants emerges spontaneously, there is no ant that oversees this process. In a similar fashion, coordination between

[2] You can watch a video that explains the concept of proprioception by clicking on this link: https://youtu.be/svMj2saD_eI

different parts of the nervous system emerges spontaneously, without any part of it being in charge of the process.

Ideomotor learning results in the emergence of associations between movement patterns and intended perceivable outcomes, also known as action-perception couplings. The brain can form action-perception couplings as a result of tight functional and anatomical links between brain areas involved in perception and brain areas involved in motor control. Current neuroscience suggests that action perception and action execution are intrinsically coupled in the human brain (Novembre and Keller 2014). This point of view is supported by the observation that individuals who perceive events of which they know (as a result of previous learning) that they may result from certain movements,

Figure 2 - Ant Bridge. Source: ASK tech (YouTube)

sometimes start performing the movements leading to them, a phenomenon known as ideomotor response activation (Elsner, Hommel and Mentschel, et al. 2002). Put differently, movements can be evoked by using their perceivable consequences as external cues. Ideomotor response activation can even be observed when individuals do not perform any physical movements. For example, various studies have demonstrated that areas of the brain associated with motor planning and execution are co-activated when musicians listen to their instrument (Bangert, et al. 2006). Furthermore, it has been shown that the imagination of perceiving an event automatically activates motor parts of the brain involved in bringing about this same event. For example, it has been found that pianists who imagine producing certain sounds on their instruments automatically activate corresponding motor areas of their brains, even when they do not move physically (Davidson-Kelly, et al. 2011). Conversely, the performance of playing gestures triggers activation of perceptual brain areas, even in the absence of perceivable action effects. It has been demonstrated that the production of silent playing movements leads to activation of auditory areas of the brain (Bangert, et al. 2006). The action-perception couplings required for music making emerge as a result of being musically active. Accordingly, the co-activations described above are only observed in individuals who had (varying amounts of) musical training. Nonetheless, it has been found that action-perception couplings are formed remarkably quickly: non-musicians develop a certain amount of co-activation of auditory and motor brain areas within a couple of days of training a simple musical task (Lahav, Saltzman and Schlaug 2007). Figure 2 shows the connections between auditory (light blue) and motor (dark blue) areas of the brain.

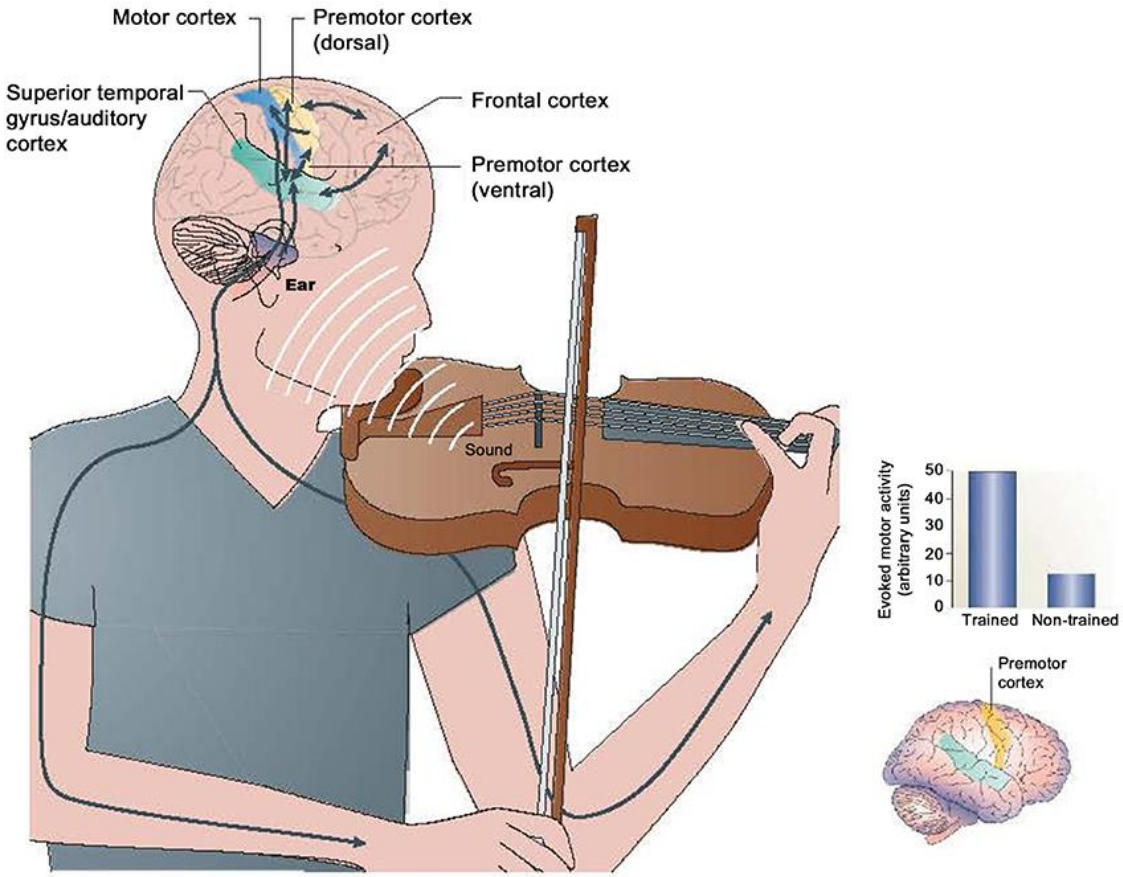


Figure 3 - Connections between auditory cortex (light blue) and motor cortex (dark blue). Source: Novembre and Keller 2014.

SUMMARY

- Our actions (movements) are initiated and guided by our intentions (what do we want to achieve). In music making, the goal of the activity is the production of intended musical outcomes.
- The transformation of intentions into actions takes place non-consciously, we are not aware of the internal processes leading to it.
- Our brain uses predictions of the sensory consequences of our actions ("what do I expect to feel/hear/see") to control our actions. These predictions are based on prior experiences.
- In our brain, perception (hearing/seeing/feeling) is intrinsically coupled with action (movement).
- We learn or improve motor skills as a result of more and better connections between perception and action. These connections emerge as a result of performing actions ("doing") and perceiving their consequences.

3 Musical Imagination

3.1 MUSICAL IMAGERY AND MUSICAL IMAGINATION

> *And, here's a clincher: ´I have never practiced scales and always got bad marks for technique' he says. So where did he get all those silvery scale passages, lightning arpeggios and thundering octaves that he releases with such ease during his performances? When asked that question by a music critic/writer from the German Suddeutsche [Süddeutsche] Zeitung, he answered, 'It is the LISTENING, not the PLAYING. I develop a sound image my mind and then I try to project this image in my music. That's all. It's not always easy, but for me it is the only possible way.'*
>
> (Interview with pianist Arcadi Volodos by Cheryl North (Volodos 2003))

Musicians have mental ("inner") representations of the musical sounds they intend to bring about. Various names are used by musicians and music teachers to describe this capacity: musical imagination, audiation, auditory imagination, inner hearing, the mind's ear, to name a few. Some instrumental musicians experience the inner drive for producing musical sounds so vividly that they cannot suppress the urge to sing or hum along whilst playing, pianists Glenn Gould and Keith Jarrett being well-known examples of this phenomenon. The capacity for hearing music in one's mind is not only found in musicians, but is present in a vast majority of people and can for example be observed by the fact that many people exhibit spontaneous musical activities such as singing, humming, whistling or rhythmic finger-tapping (Honing 2010).

Professional musicians are generally capable of vividly imagining musical sounds that are not present at that moment. The skill of reading scores of unknown pieces and forming mental images of how these pieces sound ("notational audiation") is common among professional musicians. A minority of musicians regularly apply mental practice (or, more precisely "mental imagery rehearsal"): they practice by imagining the sound of the piece they are learning, without actually producing this sound (K. Davidson-Kelly 2014). Mental practice requires both extensive musical training and considerable effort. The capacity for consciously imagining music in the absence of it is called musical imagery. It may be effortfully initiated (for example in mental practice) but can also arise automatically (Schaefer 2017, 25). A well-known example of automatically arising musical imagery is the experience of a tune being spontaneously recalled and repeated within the mind, also known as "earworms", or (more accurately) "involuntary musical imagery" (Jakubowski, et al. 2017, 122). More than 90 percent of people experience earworms regularly, i.e. at least once a week (Liikkanen 2008).

3.1.1 The difference between musical imagery and musical imagination

The concepts of musical imagery and musical intentions differ at a crucial point, namely the role of consciousness. Whereas musical imagery refers to conscious experiences of imagined music, musical intentions are not (necessarily) experienced consciously. As has been argued above, musical intentions (mental auditory representations of intended musical sounds) arise prior to and during performance, and shape musical actions, regardless of musical skill level or instrument. If musical intentions were experienced consciously during performance, the musician would experience two sources of music at the same time: his musical intentions (a split second before his actions) and the sounding music (a split second after his actions). In my opinion, this is highly unlikely because

consciously experiencing two similar, time-delayed sources of sound simultaneously would probably be quite confusing. More importantly, musicians do report having musical intentions which underlie their actions (see for example the quotations from Murray Perahia and Arcadi Volodos earlier in this booklet), but do not report their musical intentions being conscious experiences of musical sounds during performance. Given this crucial difference, the question arises how musical imagery and musical intentions are related. Bailes suggests that musical imagery may be an involuntary corollary of musical activity, such as working towards an ideal musical sound in performance based on internally "hearing" how it should sound (Bailes 2002, 1). Continuing this line of thought, musical imagery should be seen as a "side-effect" of musical intentions. Keller distinguishes between the use of mental imagery prior to performance ("offline") and during performance ("online"), (Keller 2012, 207). However, Keller does not explicitly state whether online mental imagery (necessarily) takes place by means of consciously experienced musical sounds. In his book "The Inner Game of Music", double-bass player Barry Green addresses the issue of musical intentions: "Effectively, you are playing a duet between the music in your head and the music you are performing. Any notes you play that don't correspond to your imagined sense of the music stand out, and your nervous system is able to make instant, unconscious adjustments" (Green and Gallwey 1986, 75). I assume that Green uses the word "duet" metaphorically, in the sense that he does not actually experience two sources of sound whilst playing. All in all, my impression is that the relation between musical intentions and musical imagery remains an unresolved issue.

For practical reasons, I have decided to use the term musical imagination for referring to musical intentions, using it in the following sense: non-conscious mental auditory anticipations of intended musical sounds that initiate and steer motor control processes prior to and during musical actions. I deliberately chose the word imagination, in order to emphasize the generative, flexible and personal aspects of generating musical intentions. The generative aspect of musical imagination is obvious in improvising musicians, who need to generate musical ideas "on the spot". Nevertheless, even for classical musicians (who generally perform well-rehearsed musical pieces that are notated) the emergence of musical intentions is a generative process. This can (for example) be inferred from the observation that musical scores allow performers certain amounts of freedom. Scores from the Baroque era often provide (almost) no information regarding articulation, dynamics or even tempo, thereby presenting performers with a great amount of freedom. In addition to this, musical imagination does not imply a rigid idea of how a musical piece should sound, but is inherently flexible, allowing musicians to deviate "on the spot" in response to performance circumstances, inspiration or as a result of interaction with other players. Some classical musicians exhibit remarkable performance-to-performance invariance in the musical approach of their repertoire, the classical pianists Krystian Zimerman and Arturo Benedetti Michelangeli being examples of this. Notwithstanding this observation, in principle musicians are free to decide to play pieces differently from performance to performance. An extreme example of this is the classical pianist Glenn Gould, who is reported to have played certain pieces radically different from take to take (Tommasini 2018). Even though listening experiences and demonstrations by teachers play a role in musical learning processes, musical imagination emerges as a result of internal generative processes and is therefore by definition a personal phenomenon.

3.2 THE PROCESS OF MUSIC PERFORMANCE

Musical imagination is the start and end of the process of music performance. Below is a strongly simplified diagram of this process. The purposes of this diagram are:

- To illustrate that musical imagination is the "departure point" of music performance
- To show that musicians (regardless of their level) have two main sources of intrinsic feedback, namely hearing and feeling
- To provide insight into the possible ways for teachers to guide their pupils
- To serve as a diagnostic tool for identifying which type of help your pupil needs (chapter 4)

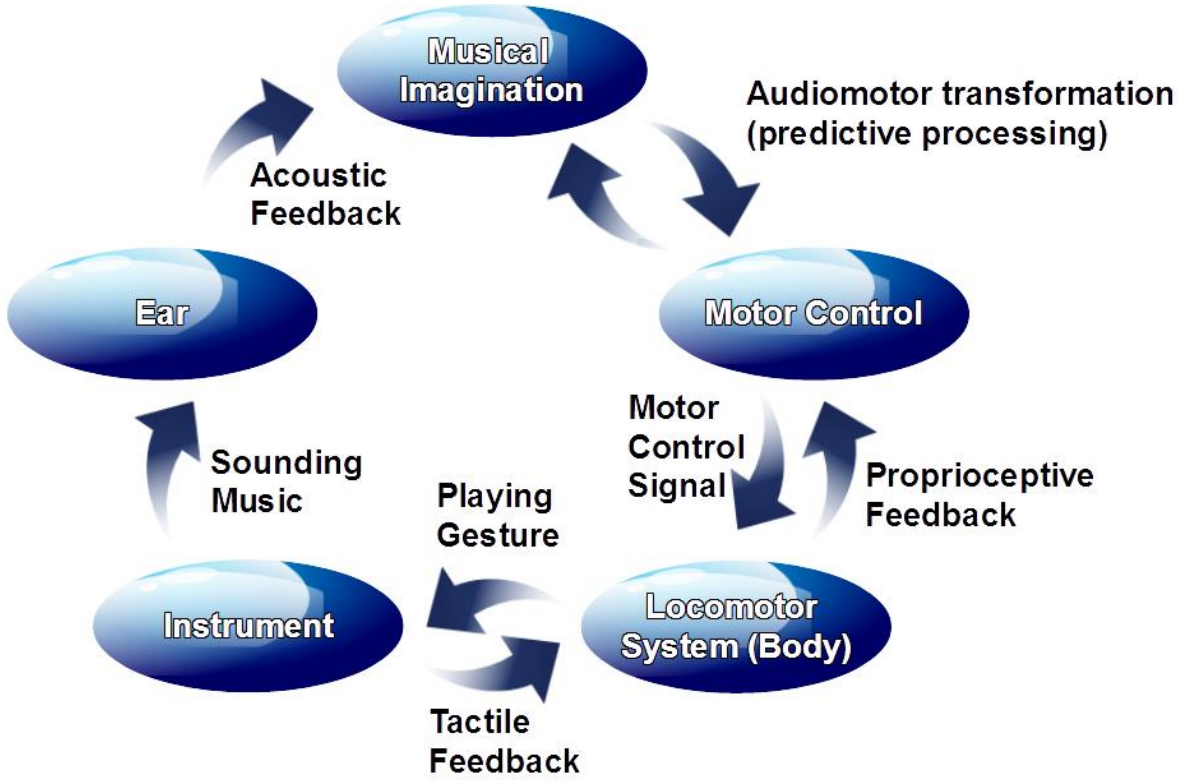


Figure 4 - The process of music performance. Created by the author.

Explanation of the events in this diagram:

1. The chain of events starts with musical imagination: the intention to produce a certain musical outcome.
2. The central nervous system makes a translation of musical imagination into motor control: audiomotor transformation. The brain achieves this as a result of the associations (couplings) between auditory and motor areas. Prior to and during musical actions, the brain predicts the consequences of them, which leads to corrections of errors even before they occur (predictive processing). The result is the production of motor control signals: the electrical signals that the central nervous system sends to the muscles. The audiomotor

transformation happens in a split-second. It is important to notice that it takes place non-consciously: moving is essentially something that "happens for us", based on our intentions.

3. The motor control signals reach the muscles and cause them to shorten or lengthen and influence the mutual position of bones. In other words, the locomotor system performs the intended actions. By locomotor system we mean: all structures in the human body which are involved in the realization of posture and movement. This includes: bones (the skeleton), muscles, cartilage, tendons, ligaments, joints, etc. Another name for this is musculoskeletal system.

4. The locomotor system sends feedback to the central nervous system. By sensors in muscles, tendons and joints the central nervous system is constantly being informed about force, position of joints etc. This stream of information is called proprioception. It leads to adjustment of the movement during the execution of it. Additionally, there is information coming from the skin of the fingertips: sense of touch (also known as tactile feedback). Please watch this video clip about proprioception: https://www.youtube.com/watch?v=svMj2saD_eI

5. In case of piano playing: Fingertips and feet of the player set the keys and pedals of the piano into motion.

6. The piano translates the movements into sounding music (vibrations in the air).

7. The ear changes the vibrations in the air into an electrical signal. The brain translates this signal into perception of the sounding music and compares this with the musical imagination which started the process. Ideally, the sounding music matches the musical imagination perfectly. If there is a difference, this leads to readjustment of step 2. As a result of one's musical actions and the perception of their consequences, the associations between auditory and motor brain areas improves, which in turn leads to learning or improving musical motor skills.

3.3 INFLUENCING THE PROCESS OF MUSIC PERFORMANCE

There are several ways in which music teachers can exert influence on the process of music performance of their pupils. Figure 2 shows the diagram of music production with additional arrows that indicate potential influences by music teachers:

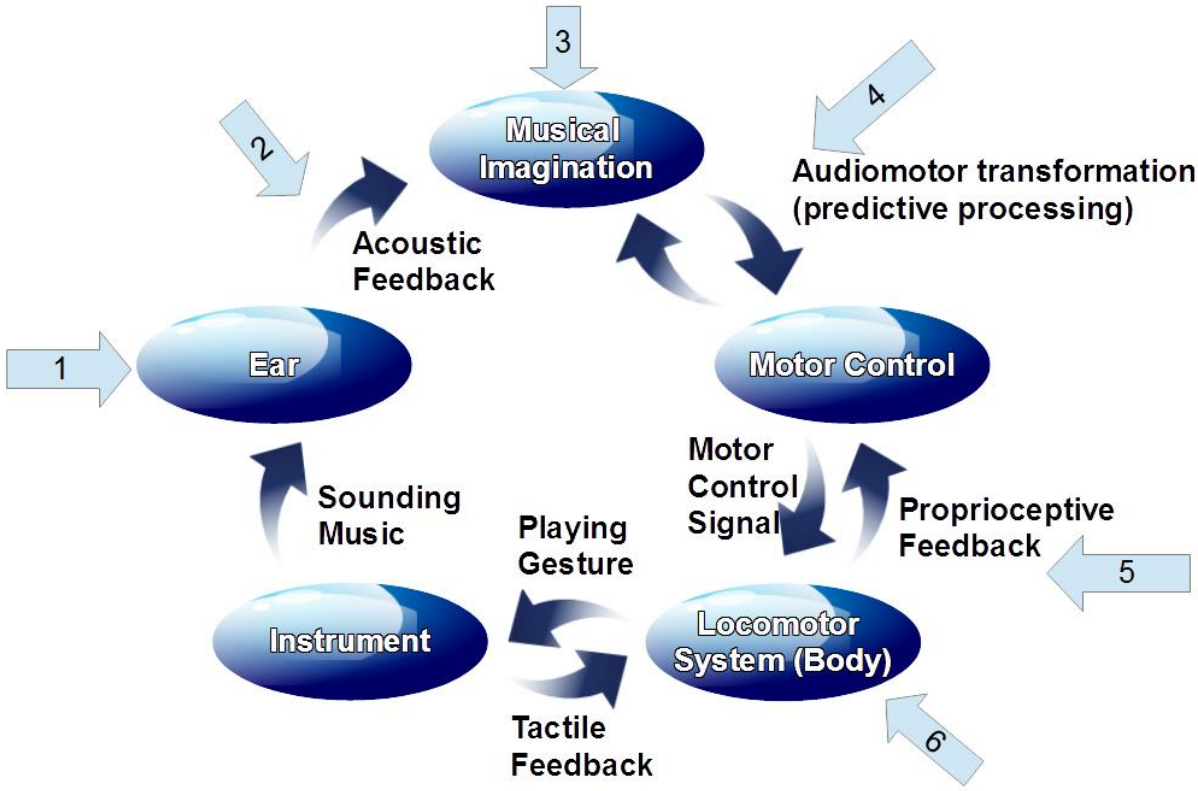


Figure 5 - Potential influences by music teachers. Created by the author.

1. **Teachers can let pupils hear something**

Music teachers often play for their pupils. They give **demonstrations** that are meant to present their pupils with ideas of the possibilities of their instrument, a way of playing a certain phrase, a possibility for improvement, or sometimes just for inspiring the pupil. Also, a demonstration is *seen* by the pupil, which (non-consciously) influences his movement imagination. In general, demonstrations **enrich** the musical imagination of the pupil. Paragraph 5.2.1 explains the concept of demonstration more deeply.

2. **Teachers can encourage their pupils to listen to a certain aspect of his playing**

In principle, this can be done in two ways: actively or passively. When teachers give **feedback** on the musical outcome, pupils passively receive information about their performance. The concept of feedback is discussed in more detail in paragraph 5.6. When teachers give their pupils a **listening assignment**, pupils actively have to listen for certain aspects of their playing. The concept of listening assignments is explained in paragraph 5.1.2.

3. **Teachers can help their pupils to enrich or clarify their musical imagination**

Enriching the musical imagination of pupils can also be achieved by presenting them with a **musical metaphor**. This concept will be dealt with in detail in paragraph 5.2.2. Also, there are musical activities that can clarify the musical imagination of pupils, such as singing, clapping, walking and playing together. These are described in paragraph 5.2.3. A clear, vivid representation of the musical

goal is a prerequisite for an accurate performance and an effective learning process of any pianistic skill.

4. **Teachers can help their pupils translating their musical imagination into movement**

Teachers can achieve this either by a literal or a non-literal movement instruction. A literal movement instruction describes how a certain movement should be performed. It may give information about the shape of body parts (for example: a curved shape of the hand), joint positions (for example: low shoulders), which joints should move, and which should not (for example: active fingers and quiet arms) or muscle activity (for example: relaxed lower arms). A non-literal movement instruction can be given in the form of a **movement metaphor**. This concept is described in detail in paragraph 5.5.1. Even though literal movement instructions are very common in music teaching, there are certain downsides to them. These will be explained in paragraph 5.5.

5. **Teachers can trigger the awareness of certain aspects of their pattern of movements within their pupils**

This can be achieved by giving the pupil an **awareness instruction**. This concept has been put forward by Barry Green and Timothy Gallwey in their book "The Inner Game of Music" (Green and Gallwey 1986). Awareness instructions ask the pupil to pay attention to what is happening, without judging it as "right" or "wrong". They are contrasted with "do this" instructions. Green and Gallwey give the following example of how a "do this" instruction can be translated into an awareness instruction:

- "Do this" instruction: *"Play the piano with your fingers curved in a 90-degree angle from the third knuckle."*
- Awareness instruction: *"Notice the difference in the way the support of your arm feels when your fingers are slightly curved, and when they are more curved. Play in whatever way lets your fingers feel the most support."*

6. **Teachers can help their pupils to find suitable postures or playing gestures by means of physical contact**

This pedagogical technique is called **facilitation** or guided movement. You can read more about it in paragraph 5.5.3.

Finally, teachers can help pupils to practise effectively. This is not represented as an arrow in the diagram, since it involves the whole process of music production. Learning how to practice has a big influence on the acquisition of pianistic skills. You can read about the guidance of the practising process in paragraph 5.4.

SUMMARY

- The ability to imagine musical sounds that are not present is called musical imagery. Almost everybody has this capacity.
- The musical intentions that musicians have during their playing are not (necessarily) conscious experiences of imagined musical sounds
- Music making can be considered a process with two intrinsic sources of feedback: musicians **hear** the sounds they produce and **feel** the physical consequences of their actions

- Most of the processes involved in music performance take place non-consciously
- Music teachers can influence the process of music performance within their pupils in various ways

4 PROBLEM ANALYSIS

Find the weakest link in the chain Musical imagination – Motor control – Action – Listening.

KEY POINT

The purpose of this chapter is to show you how you can use the diagram of musical imagination as a diagnostic tool, for finding out what type of help your pupil needs.

4.1 DANCING ELVES AND CLOG DANCE

For piano teachers it is relevant to know what the weakest link in the process of music production within their pupils is: musical imagination, listening, movement, or practicing. Based on this diagnosis, they can choose a didactic approach.

Let's deliberately take an exaggerated example to clarify how this works in a piano lesson. Suppose that you gave your pupil a piece with the title "Dancing Elves" (please see the score at the end of this chapter). It's a very refined piece, with mostly soft dynamics. It is supposed to sound very delicate, with light staccato's, fluent rhythms and gentle accents. After a week of practising, your pupil plays the piece in such a way that it sounds more like a "Clog Dance": mostly loud, with heavy staccato's, clumsy rhythms and uncontrolled accents (also see this score at the end of this chapter).[3]

What might have happened? What is the weakest link? There are four scenarios:

A) **Musical imagination is the weakest link.** Your pupil imagines this piece as a clog dance or has an indefinite imagination.
B) **Listening is the weakest link.** Your pupil imagines the piece as "Dancing Elves" but does not realize it sounds like a "Clog Dance".
C) **Movement is the weakest link.** Your pupil does imagine the piece as "Dancing Elves", plays it like a "Clog Dance" and hears the difference between his/her intention and the result.
D) **Practising (quantity and/or quality) is the weakest link.**

4.2 FINDING THE WEAKEST LINK

There are several ways of finding out what is the weakest link:

- When pupils **correct themselves frequently** during playing, this can be an indication that they hear that it does not sound as intended but are (at this moment in their learning process) incapable of finding a suitable playing gesture. This would rule out scenarios A and B. Pupils who have trouble in achieving their musical imagination often experience frustration, which is sometimes visible in their posture or facial expression.

[3] A clog is a wooden shoe. Clog dances are typically not very refined musically…

- Occasionally, pupils explain what they experienced during playing. For instance, pupils sometimes say that they know what it should sound like but cannot quite achieve that (scenario C). Now and again, pupils say that they did not practise enough (scenario D).
- You can ask pupils to sing the melody or clap the rhythm of the piece. If they sing or clap in the same way as they played (i.e. not fluently), you know that scenario A is plausible.
- When pupils sing or clap fluently, you can ask whether they notice a **difference** between how they sing/clap and how they play. If they notice a difference, you know that scenario C is probably the case. If they do not notice a difference, it is probably scenario B.

Note: in reality it is not always 100% clear what the weakest link is…

4.3 PEDAGOGICAL APPROACH FOR EACH SCENARIO

Musical imagination is the weakest link

Your pupil imagines the piece as a "Clog Dance" or has an undefined imagination. The piece sounds as he intended. The action is correct, the feedback is correct, but the musical intention is different from the composer's intention. Musical imagination is therefore the weakest link. Your job as a teacher is to change or enrich the intention. Which options do you have?

1. You can play (a part of) the piece for your pupil. You give an inspiring example of how the piece and the instrument can sound. You enrich his musical imagination. Playing together is also a very nice way of teaching without words. Pupils pick up many things by playing together with you, or with other players. The subtleties of musical expression are often hard to explain verbally, but they can be conveyed non-verbally, for instance by playing together.
2. You can encourage your pupil to clarify or enrich his imagination. In this situation to speak about how Dancing Elves might sound is a good idea. In this case the title of the piece is already a very nice metaphor for the type of sound which is required. Make sure your pupil knows what elves are… After such a chat most pupils can change their performance radically. Other options for enrichment or clarification include:

- Invent a story about elves or let your pupil invent a story about them.
- Sing the song together and use a voice colour which suits the character of the piece.
- Speak or clap the rhythms together, this improves the rhythmic aspect of musical imagination.
- Advanced: ask your pupil to imagine the sound of the piece without playing and afterwards to play it. This is one of the forms of mental practice.

Listening is the weakest link

Your pupil imagines the piece as "Dancing Elves" but does not realize it sounds like a "Clog Dance". In this case listening (acoustic feedback) is the weakest link. Your job as a teacher is to "open up the ears" of your pupil. There are two possible methods:

1. Give **feedback** about the sounding result to your pupil. This is a passive strategy. If you do this, make sure not to give your opinion, but rather a more factual description of how it sounded. Also make sure to translate your feedback into achievable steps for improvement.

In this case for example, you could say: “I heard that you played mostly forte. Did you hear that too? I think that it will sound more like Dancing Elves if you play piano or pianissimo. Let’s see how it sounds if you do that.”

2. Give your pupil a **listening assignment** or ask a question about the sounding result. This is an active option. Examples of questions:

- *Does it sound like Dancing Elves already?*
- *How do you think this piece could sound like Dancing Elves even more?*
- *Do you hear the same dynamics as in the score?*
- *Did you notice that some notes were suddenly loud?*

Examples of listening assignments:

- *Play and listen to whether all notes are equally light*
- *Play and listen whether all notes occur in a fluent rhythm*
- *Play and listen whether you can hear the melody in the foreground*

3. Let your pupil listen to a recording of his/her playing. You can follow this up by letting your pupil tell you what he/she noticed (reflection), or giving your pupil a listening assignment.

In most situations improved listening will lead to immediate improvement in the playing.

Movement is the weakest link

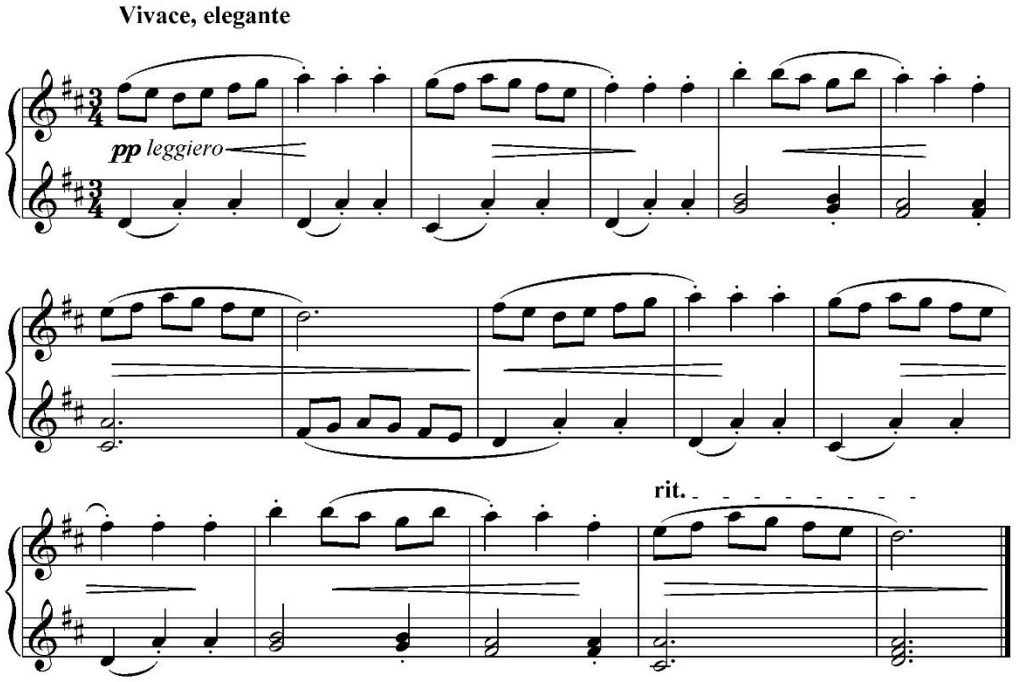
Your pupil does imagine the piece as “Dancing Elves”, plays it like a “Clog Dance” and hears the difference between his intention and the result. In this case the movement (action) is the weakest link. There is a gap between musical intentions and outcomes. Your job as a teacher is to help your pupil in finding a suitable fingering, playing gesture and/or posture for realizing his musical imagination. In other words: you help the pupil to close the gap between imagination and sounding result.

If you choose a strategy that involves a literal instruction on how to move, you apply **explicit motor learning**. If you choose a strategy that does *not* involve a literal instruction on how to move, you apply **implicit motor learning**. You can read more about these concepts in paragraph 5.5.

Practising is the weakest link

In this case you observe that your pupil is unnecessarily slow in learning, achieving fluency, memorizing or polishing the piece. Both quality and quantity of practising are very influential on the development of playing quality. However, practising is a topic that requires a lot of time to discuss properly. Therefore, in this syllabus we will only mention the most important features of effective practice in paragraph 5.4. We will discuss practising as a topic on its own and go more into the details later in the piano methodology (KC) or MEB (Codarts) course.

Dancing Elves



Clog Dance

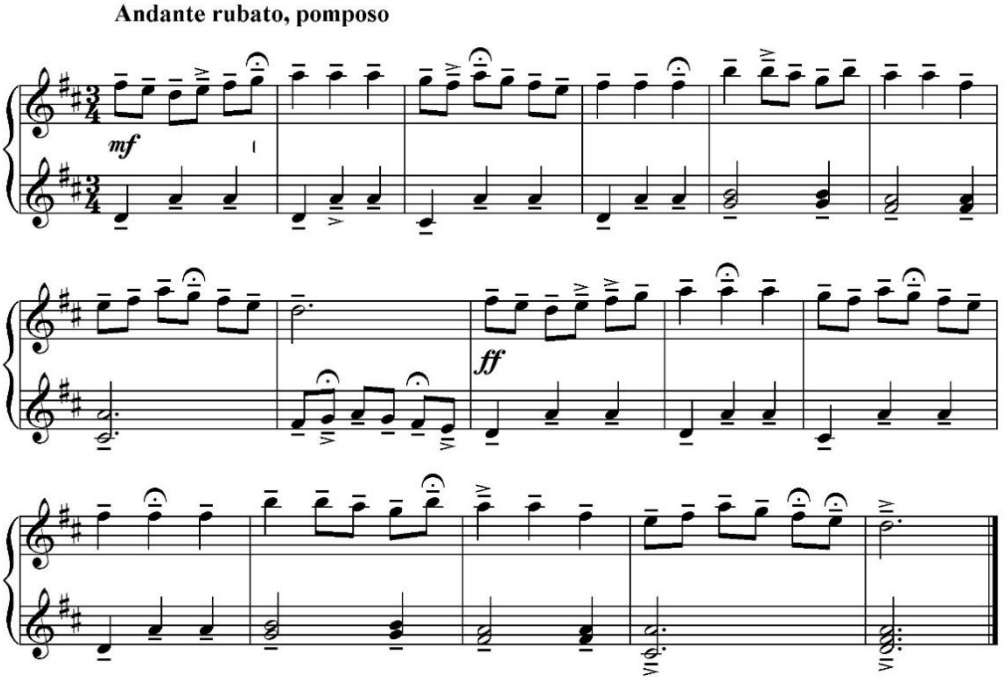


Figure 6 - Dancing Elves and Clog Dance. Created by the author.

5 GUIDELINES AND PEDAGOGICAL TOOLS

In this chapter, I present a set of guidelines that underlie the intention-based approach to pianistic quality. Each recommendation is explained briefly. Together, the guidelines are intended to show you the general direction towards creating optimal circumstances for the acquisition of pianistic skills of your pupil. Additionally, pedagogical tools that relate to each guideline are mentioned. A pedagogical tool (or: “working form”) is an approach or strategy that teachers apply in the lesson in order to help their pupils to learn or improve a certain skill.

These are the guidelines for a intention-based approach of pianistic quality:

- Enrich the musical imagination of pupils in terms of possibilities in sound of piano. Make sure they have a clear idea (musical imagination) of what they want to achieve or improve
- Allocate a central role in the learning process to the ability of pupils to listen to the instrument
- Apply in-between steps in situations where pupils find it difficult to achieve something
- Guide pupils towards effective practice strategies and a growth mindset in relation to learning new and difficult pianistic skills
- Help pupils in finding a playing gesture that suits the musical goal, without describing that gesture literally or imposing it as a movement norm: Implicit motor learning
- Give specific, goal-oriented, descriptive and delayed feedback and let pupils give self-feedback. Translate negative feedback into feasible steps for improvement
- Apply the law of effect: every instruction or exercise should lead to an improvement of the musical result which is perceived by pupils. If pupils hear that their playing sounds better, it will be easy for them to remember the improved motor performance.

5.1 ENRICHING AND CLARIFYING MUSICAL IMAGINATION

In order to acquire pianistic quality, pupils need to get to know the possibilities in terms of sound of the piano. Inspiring and instructive *demonstrations* of how the piano can sound are crucial in this process. One well-chosen demonstration may have more effect than a thousand words. Additionally, demonstrations are necessary for giving pupils a clear musical idea of the intended outcome of their playing, or possible improvements in it. Therefore, do not hesitate to give demonstrations to pupils. Another tool for enriching your pupil's musical imagination is by applying a *musical metaphor*: you change pupils' ideas of the musical outcome by means of an analogy. Additionally, playing together is a nice way to implicitly convey musical ideas that are difficult to express verbally, such as sense of style, sense of atmosphere and sense of timing. Finally, there are activities that you can let pupils do in order to *clarify* their musical imagination.

5.1.1 Demonstrations

Demonstrations can be applied as an educational tool in several ways. Here are some examples of applications of demonstrations:

Demonstration preceded by a point of attention	*I'll play this passage for you. Listen to the difference between this legato line and these staccato notes*
Demonstrations of musical "options"	*You can go from piano to forte suddenly [demonstration] or gradually [demonstration]. Which one did you like best?*
Demonstration with a deliberate "mistake" (reversal of teacher- and pupil-roles)	*I'll play this passage for you, something is not right. Perhaps you can find out what I should improve.*
Demonstration of how your pupil sounds, followed by how it could sound better ("Respectful imitation")	*You sound like this [demonstration]. It can also sound like this [demonstration]. Now you try it out.*
Contrasting demonstrations with a listening assignment	*I'll play this passage twice. Afterwards, I want you to tell me which difference you heard.*

Table 1 - Applications of demonstrations

5.1.2 Musical metaphors

Music teachers can influence the musical imagination of their pupils by using musical metaphors: they present pupils with analogies between the musical effect of a note, motif, phrase or the whole piece and something outside of the piece. An important source of useful metaphors for pianists are the sounds of other instruments and the human voice. Often, the first movement of a classical Sonata is comparable to a classical Symphony, and pianists aim for creating the illusion of an orchestral sound, with tutti sections, string sections, horn lines, etcetera. In case of lyrical repertoire (for example Lieder ohne Worte by Mendelssohn), pianists strive for sounding like a singer-and-pianist duo.

Musical metaphors can also be derived from sources outside of music. When a piece has a descriptive title (for example "The limpid stream", "Traümerei" or "The sick doll"), there is a ready-made metaphor that the teacher can use in order to influence the musical imagination of his pupil. In case there is no descriptive title, the teacher might make up some story that matches the musical events of the piece. An example of this are the descriptive titles Alfred Cortot and Hans von Bülow have given Chopin's op. 28 Preludes.

Finally, there are all sorts of creative extra-musical metaphors that music teacher use: Jacuzzi's, elephants dropping from the sky, flowers that open, quarrelling housewives...

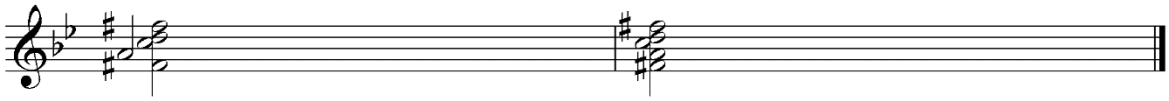
5.1.3 Activities for clarifying musical imagination

Music teachers can let their pupils perform activities that clarify their musical imagination. Some of these can be done *without* the piano. For instance, walking across the lesson room and singing the melody of the piece can help the pupil to create a sense of unity of tempo. Also, singing complicated

and fast rhythms can yield clarity about how they should sound, which in turn can greatly raise the rhythmical accuracy of playing.

Another example of an activity that clarifies the musical imagination of pupils is the following way of practising the dynamic balance within a chord. Let's take a chord in which one of the middle notes should be emphasized, because it is part of a melodic line.

- First, play the chord divided over two hands, play the melodic note (in this case the A) with one hand, the harmonic notes with the other hand
- Continue playing the chord until you are satisfied about the sound
- Now play it with one hand and aim for the same sound
- Alternate between playing it divided over two hands and with one hand



This activity allows pupils to first get an idea of how they want the chord to sound, without having the difficulty of producing this with one hand. After finding an appropriate balance between the notes, they now play the chord with one hand, having a clear idea of the sound they want to produce.

Finally, mental practice is a tool for clarifying the musical intention. Some musicians learn a new piece by reading the score and imagining the sound of it. The famous pianist Dinu Lipatti went even further and continued to practice mentally until he had obtained a vivid idea of how an ideal master would perform the piece, only then allowing himself to play it on the piano (Tanasescu and Bargauanu 1988). This is mental practice at its highest level, requiring an extremely well-developed musical imagination. It is possible to apply mental practice in an easier way, in order to make it feasible for intermediate pupils. An example of a relatively easy form of mental practice is the “imagine-play”-technique in which pupils alternate between playing a musical phrase physically and mentally. Sometimes this task gets easier when the pupil performs finger-movements in the air (“air-piano”) whilst imagining the sounds of the phrase.

5.2 LISTENING TO THE INSTRUMENT

The ability to listen to the sounds the piano produces is a crucial factor in acquiring pianistic skills. The good news is that it develops over time and that you (the teacher) can help your pupils in this development!

When pupils play pieces in the lesson, you immediately hear what should be improved. After all, you have highly-trained ears for pianistic quality that can perceive even the tiniest of mistakes: wobbly rhythms, gaps in legato lines, unintended accents, unclear pedalling... Your pupils do not yet possess this skill, their ears are less capable of finding out what can be improved in their playing. Below I describe five pedagogical tools that you can apply in order to stimulate your pupils’ development of listening skills.

5.2.1 Concentric approach

Imagine a heavily polluted, disordered room with broken windows and worn out carpet. It is full of furniture, shelves, books, newspapers, toys, plants... Nowadays, there are “cleaning coaches” who professionally assist people who live in heavily disordered houses. How do these coaches approach their task? Here are some strategies that they apply:

- Many different things must be done in order to make the room ready for living in it: throwing away, organizing, cleaning, fixing... They cannot be done all at the same time. **Do it one task at a time.**
- Take something that you can reach now: a **feasible task**
- They should be done by the **owner** of the room, with his own two hands
- **Celebrate** each little victory. This is beneficial for developing a growth-mindset/self-efficacy (Dweck 2006).[4]
- Over time, the owner should develop the ability to recognize which elements of the room are messy or dirty, so that the owner can take care of it **independently**

Sometimes, the playing of pupils can be compared to a disordered room. There are many things to be improved: playing the right notes, rhythmic fluency, articulation, dynamics, pedalling, sense of phrasing, sense of style, etcetera. The job of the piano teacher can be compared to that of a cleaning coach, and similar strategies are applicable:

- Many different things must be improved. Pupils cannot focus on all these improvement points at the same time. **Take one aspect of the music at a time.** Continue working on this until your pupils “get the hang of it” (i.e. until they reach a basic level of mastery in this aspect). This contrasts sharply with the masterclass-approach of teaching, in which many points of attention are given, generally in random order, and not much time is spent on *integrating* the improvements. Note: the practicing strategy “Rotational Attention” is also based on taking one point of attention at a time, see paragraph 5.4.6.
- Start with working on an aspect of the music that is both simple and influential: **a feasible and rewarding task.** Depending on the context, you can choose to work on *overall* aspects, such as rhythmic coherency or functional fingerings, temporarily ignoring certain details. Generally, this already cleans up the playing of pupils, which they might experience as rewarding.
- The improvements take place as a result of the repetitions and listening skills of pupils **themselves**. This means that it is vitally important that pupils have a clear idea (musical imagination) of what to improve.
- **Celebrate** each little improvement in pianistic quality. You can already do this by simply *mentioning* the differences that you hear or asking pupils to reflect on improvements they hear themselves.

4 A growth-mindset means: the pupil believes he can acquire a certain skill, provided he invests effort or study. You can read more about this in: Carol Dweck (2006), *Mindset: The New Psychology of Success*.

- Over time, pupils should develop the ability to recognize which musical aspects they should improve in their performance, so that they can work on them **independently.** For this reason, *reflection* is an important tool in teaching. You can read more about this in the paragraph on self-feedback (5.6.5).

Concentric learning typically progresses from general to specific: overall aspects are worked on first, some details are deliberately postponed until the pupil is ready for it in order to prevent an overload of points of attention. This is comparable to an approach of drawing in which the artist first makes a sketch, and then gradually goes towards the details. Contrastingly, in eccentric learning, details come before having an overview of the project, comparable to drawing the leaves of a tree before sketching the overall design of a landscape. In my opinion, a concentric learning approach is preferable.

5.2.2 Listening assignments and reflection

Listening assignments are an effective tool for the development of listening skills. With a listening assignment, teachers stimulate their pupils to listen to a specific aspect of their own playing. The general format for a listening assignment is:

"Please play [section of a piece] and listen to [aspect of pianistic quality]."

Part of the power of listening assignments is explained by the fact that they trigger pupils to focus on the musical outcome of their actions, rather than on how they move: an external focus of attention. See chapter 5.5.2. Following up a listening assignment, you might ask pupils to reflect on what they heard. This gives you (the teacher) information about their listening skills. This can reveal that your pupils are not yet capable of hearing certain differences in the outcome of their actions, which enables you to address this, for instance by providing contrasting demonstrations.

5.2.3 Stepwise increasing musical demands ("Musical challenges")

A nice way of challenging pupils towards a higher pianistic quality, is by increasing the musical demands step by step. In other words: you pile up the musical demands in layers. An example:

1. *Listen whether you hear a steady pulse in this passage*
2. *Now, listen for the differences between the dynamic levels **and** the steady pulse*
3. *Focus on the sharpness of the staccato's, the dynamic levels **and** the pulse*

Pupils can use a similar strategy when practicing at home, challenging themselves in a stepwise manner.

Musical challenges implicitly provide challenges for the quality of posture and movement. They trigger motor control processes within pupils to come up with solutions (playing gestures) that meet the raised musical demands. Please watch this video clip, in which you can see the differences in posture and playing gesture that a musical challenge can bring about:
https://www.youtube.com/watch?v=NG8RcX4y3t8

5.2.4 "Pick your favourite"

This game activates pupils' ability to evaluate their performance and is therefore a tool that is based on reflection. The game goes like this:

Play this passage three times. Afterwards, tell me which of the three performances of it had the most gradual crescendo.

Of course, you can replace “the most gradual crescendo” with other points of attention, such as “the most fluent rhythm” or “the nicest balance between melody and accompaniment”.

5.2.5 Mediation

Mediation is a practice technique in which pupils deliberately alternate between playing the “right” and the “wrong” way. This is a fundamentally different approach from only repeating the right way of doing it, attempting to suppress the wrong way. Rather, mediation aims at learning to recognize the difference between the right and the wrong way, thereby giving learners more control over their performance.

Mediation is applicable to almost every pianistic skill. Some examples:

- Deliberately play both the old (unfunctional) and the new (functional) fingering
- Deliberately play both a too heavy and a light staccato
- Deliberately play both with and without melodic direction
- Deliberately play both with the accompaniment on the foreground and with the melody on the foreground
- Deliberately play both with legato-pedalling and with “gaps” between the chords

5.3 IN-BETWEEN STEPS

Often, complicated skills can be broken down into several steps. In general, you can look for the easiest form of a certain skill and build up the complexity in a stepwise manner. Here are two examples of in-between steps for pianistic skills:

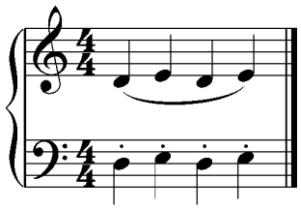
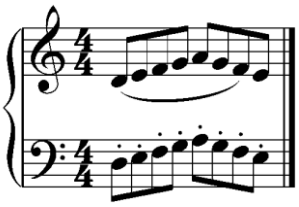
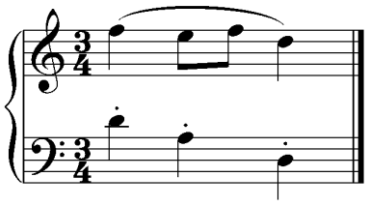
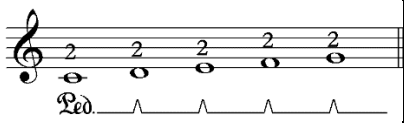
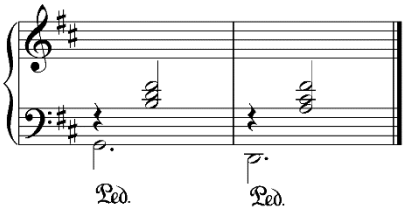
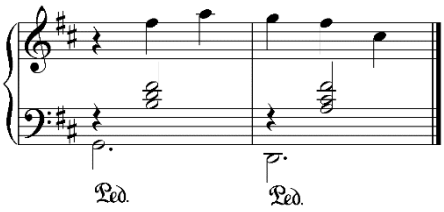
Pianistic skill: Different articulation for both hands		
Easiest application	**In-between step**	**Final form (as written in the piece)**
		
Pianistic skill: Legato pedalling		
Easiest application	**In-between step**	**Final form (as written in the piece)**
		

Table 2 - In-between steps for pianistic skills

In-between steps are a nice tool for pupils to have, since it reduces the time they need for reaching success. Also, in-between steps are helpful for practicing at home, facilitating retrieval of the skills that were trained in the lesson.

5.4 Effective practice strategies

Both the amount of practising and the way pupils practise are very influential on the development of pianistic quality. Practising is an extensive topic; therefore, we will discuss it more deeply later in the methodology/MEB course. However, it is useful to already get an impression how certain practice strategies can be applied in relation to pianistic quality. Therefore, I briefly introduce some of the most relevant ones.

It is important to note that the *quality* of practice is strongly influenced by the relation between learning goal and practice strategy. Learning goals change throughout the learning process of a piece, and the approach of practising should change accordingly. Metaphorically speaking, we should eat soup with a spoon, and chop wood with an axe, not the other way around. As an example, when "getting acquainted with the piece" is the goal, playing the whole piece through slowly, with stops, is a suitable practice approach. When "making the difficult passages smooth" is the goal, this practice approach would not be useful. Rather, to practise the most difficult passages in a more focused way, applying musical variations is much more effective.

5.4.1 Variability practice

According to pianist, music teacher and psychologist Adina Mornell, music is "flex-ability": we need to train skills in such a way that we can apply them flexibly in performance, since performances are

unpredictable, and musicians need to adapt to the circumstances. What we do in performance is never just a repetition of what we practise (Wulf and Mornell 2008). If a musician practises the same skill in only one way repeatedly ("repetitive practice"), he will build up speed, but is unlikely to acquire the necessary flexibility. He runs the risk of getting stuck in performance. Instead, it is much better to practise using variations of the skill ("variability practice") so that the skill remains flexible and the adjustments called for by the performance can be made. Mornell summarizes this approach as "Repeat without repeating".

Rather than asking your pupil to play a certain passage a certain number of times, or for a certain amount of time, it is much better to ask him to apply variations in articulation, dynamics, tempo, accentuation, etcetera. A further advantage of this approach is that it is much easier to stay concentrated in varied practice than in repetitive practice. Finally, varied practice triggers creativity in your pupil, which is a very healthy ingredient for effective practising.

5.4.2 Informal practice

I once had a pupil who did juggling for a hobby. He could juggle with four cones quite well and wanted to learn how to juggle with five cones. He (cognitively) "knew" the pattern of throwing and catching five cones, practiced fanatically for many days, but failed. Out of frustration, he stopped trying. Afterwards, he was "messing around" with four cones for a while, trying out some random patterns intuitively. He suddenly realised that his "improvisations" with four cones were actually preparatory steps for juggling with five cones. Much to his surprise he found out that he could now juggle with five cones.

The learning process described above is called informal practice: a creative approach towards learning difficult skills. It is a fundamentally different approach from formal practice, in which a new skill is tried and repeated until a certain level of success is reached. Informal practice is a very nice practice strategy for pianistic skills. It stimulates concentration, motivation and enjoyment, and as a result it is more productive than repetitive practice. In general, any difficult or new pianistic skill can be approached creatively. Here are some examples:

Pianistic skill	**Repetitive practice**	**Informal practice**
Rapid descending chromatic scale (like on the final page of Für Elise)	Repeat the scale as written in the piece	Start and end on random notes, play in different rhythms, also play the ascending scale...
Legato thirds	Repeat the passage of the piece	"Mess around" with legato thirds, try it out with different combinations of notes...

Table 3 - Informal practicing of pianistic skills

5.4.3 Desirable difficulties

In order to develop skills that are both flexible and stress-resistant, it is helpful to integrate a healthy amount of challenge into the practice routine of a pupil. Challenges can stimulate pupils to go beyond just "mastering" a certain pianistic skill and reaching a higher level of proficiency. In other

words: at a certain stage of the learning process, it is helpful to create “desirable difficulties” (Bjork 1994). This is especially relevant when pupils are preparing for a performance.

Desirable difficulties can be created by getting pupils “out of their comfort-zone”. One way of doing this, is by manipulating the circumstances of playing. Here are some examples:

- Play the piece in different octaves (this can be surprisingly hard)
- Play the piece without pedal
- Change the position and height of the chair
- Play with deliberate and unexpected background noises (you need a volunteer for producing these)
- Play with your eyes closed
- Play the piece a lot faster or slower than required

5.4.4 The three-second rule (Wieke Karsten)

When listening to certain musicians practicing, it strikes me how “rushed” their practicing sounds: they repeat a passage over and over, hardly taking any time between the repeats. Over time, their success-rate increases. However, their practice style feels like “trial-and-error”. Although I can understand why musicians practice this way (“Time is precious”, “Practice makes perfect”, “Repetition is the mother of all learning”), I think a practice style with more “space” for listening to your own playing would produce better results.

The flutist Wieke Karsten (flute teacher and teacher of Effective Practising at the Royal Conservatoire of The Hague) shares this observation and has developed a simple, yet influential tool for guiding her students towards a calmer practice style: the three-second rule (Karsten 2012). This rule is simply:

After playing this passage, take three seconds before playing it once more

Creating three seconds of silence allows the brain to evaluate and process the information arising from the performance of the passage, both the acoustic and the proprioceptive feedback. This in turn leads to better preparation of the next performance of it, increasing the success rate more quickly than using a trial-and-error approach.

5.4.5 Practise practising in the lesson

Only telling pupils how to practice is generally not enough for them to apply it at home. Practicing together, in the lesson, is more likely to cause pupils to practice in a similar way by themselves. By doing this, your pupils can *experience* the results of certain practice strategies. Success experiences are the most powerful tools for changing behaviour. Therefore, practising together is a healthy ingredient for a music lesson.

Additionally, it is helpful to openly discuss how pupils have approached practising at home. Even though a certain approach of practising has been discussed and applied in the previous lesson, this does not guarantee that pupils have practised like this at home. Often, pupils stick to a way of practising that has produced results in the past. At an early stage of learning to play piano, pieces are short and simple. As a result, just playing them repeatedly generally is enough for making them fluent over time. However, when pieces get longer and more complicated, more sophisticated

practice strategies are required. It takes courage to let go of old ways of practising that have produced results, it takes time to develop trust and confidence in new ways of practising.

5.4.6 Rotational Attention (Gerhard Mantel)

Imagine that you have ten rabbits. They have escaped from their cage and now they are happily hopping around in your backyard. You want to catch them and put them back in their cage. However, if you try to catch all ten of them at once, you will not catch any of them. The solution is to pick one rabbit at a time, focus on it, temporarily ignore the others, until you have caught it. Then you switch your attention to one of the remaining rabbits.

When teachers give their pupils too many points of attention, there is risk of pupils feeling overwhelmed, as if they must catch ten rabbits at once. Like the story described above, it might be a better strategy for pupils to focus on one aspect of the music, temporarily ignoring other aspects to be improved. As soon as this aspect is mastered or has been improved, they can switch to one of the remaining points of attention. After a while, it will become possible to do everything right at the same time. This practice strategy is called “rotational attention” and is described in detail by cellist and cello teacher Gerhard Mantel (Mantel 2001). It can also be used as a pedagogical tool, especially when working on pieces in which many things must be improved (see also the concentric approach, described in paragraph 5.1.1).

5.5 IMPLICIT MOTOR LEARNING

Imagine a novice pupil who finds it difficult to play a certain fast run in a smooth rhythm. What can piano teachers do to help this pupil overcoming this difficulty? One option is to help this pupil by presenting him with literal movement instructions like: “curve your fingers”, “move your fingers actively” or “relax your shoulders”. Another option is to present this pupil with a movement metaphor, for instance to imagine drumming his fingers as if he is bored by waiting (a situation from daily life) or imagining his fingers move like the legs of a spider. The first approach (involving literal movement instructions) is called explicit motor learning, the second (not involving literal movement instructions) is called implicit motor learning.

Implicit motor learning has been found to have advantages over explicit motor learning that are relevant for music pedagogy. Numerous studies have demonstrated that implicitly learned motor skills are less susceptible to deterioration under psychological stress, compared to explicitly learned motor skills (R. Masters 1992), see Zhu et al. for an overview of studies that have shown this (Zhu, Poolton and Masters 2012). The relevance of stress-resistant skills is self-evident in the field of music. Furthermore, implicit motor learning has repeatedly been found to produce motor skills that remain relatively stable whilst performing a second task concurrently (“multitasking”), in comparison with explicit motor learning (Maxwell, Masters and Eves 2003). This benefit is meaningful for musicians, since musicians typically must be able to perform whilst carefully observing other members of an ensemble, often having to adjust aspects of their performance (such as timing and dynamics) to a high level of accuracy. Continuing this line of thought, acquiring motor skills implicitly may give musicians more attentional “space” for musical communication with their fellow performers. Furthermore, implicitly learned motor skills have been demonstrated to have enhanced transfer to novel situations and skills, relative to explicitly learned motor skills (Totsika and Wulf 2003). In other words, an implicit learner outperforms an explicit learner when required to perform a variation of the trained skill in question or having to perform the skill under different circumstances. This is a

relevant benefit for musicians, since having to perform under widely varying circumstances is a normal element of the life of a professional musician.

Researchers have presented several explanations for the benefits of implicit motor learning. Richard Masters (1992) has proposed the "reinvestment theory" to explain the relative stress resistance of implicitly learned motor skills. This hypothesis states that relatively automated motor processes can be disturbed by the learner trying to exert conscious control over his movements based on task-relevant declarative knowledge. According to Masters:

> *[…] if, in passing from novice to expert, or unpractised to practised, explicit learning can be minimized, the performer will have less conscious knowledge of the rules for execution of the skill, and will be less able to reinvest his or her knowledge in time of stress. This should result in a lower incidence of skill breakdown under stress. In practical terms, the performer will be less likely to choke. (R. Masters 1992)*

Another explanation for the relative ineffectiveness of explicit motor learning might be that generalized postural and movement norms ("how one should sit and move properly") are not very valuable. Posture and movement are personal: people accomplish motor tasks differently; each person possesses a recognizable "movement style" that is unique for this person. It is important to note that posture and movement arise from complicated control processes. The resulting posture and movements should be considered "optimal solutions" for an individual, since the nervous system autonomously strives for accuracy and energy-efficiency of movements. In other words: the tendency to develop towards accuracy and efficiency is "built-in" in our nervous system. Generalized movement norms don't do justice to this fundamental characteristic of the nervous system.

We will discuss three categories of implicit motor learning, applied to piano teaching, namely movement metaphors, external focus of attention and facilitation.

5.5.1 Movement metaphors

Please watch the following fragment of the film "Ballerina": https://youtu.be/kEhTQx5u2OU

The ballet teacher in this fragment does not tell her pupil how she should move her feet in landing and jumping. Rather, she creates a task that guides her pupil in the desired direction: ring the bell, and land without splashing the water. The pupil then finds an **analogy** between the landing of a feather and the landing of her feet, which helps her to find how to do it successfully. This analogy can be considered a movement metaphor.

Rather than describing a playing gesture literally, piano teachers can use a movement metaphor in order to trigger a certain movement sensation in their pupils. Technically, this is called analogy learning. It is a way of guiding the pupil towards discovering a movement that suits a certain musical goal. In order to get an idea of how this can be applied, let's start with a couple of examples from piano pedagogy:

Explicit motor learning	Analogy learning (movement metaphor)
"Keep your hand steady and move your fingers"	*"Imagine your hand is a spider and your fingers are its legs"*
"Sit up straight"	*"Sit like a king"*

Table 4 - Applications of analogy learning in piano pedagogy

Here are some examples of analogy learning applied to learning various instruments:

Instrument	Goal	Movement analogy
Cello	Find a suitable posture with the instrument	*"Give the cello a bear hug"*
Recorder	Preparation for articulation by tonguing	*"Imitate the sound of a bazooka"*
Saxophone	Find the embouchure (early stage of learning)	*"Imitate the face of a beaver"*
Singing/ wind instruments	Breath support	*"Breath in and out very quickly, like a little dog that has been running"*

Table 5 - Application of analogy learning in various instruments

One of the reasons why analogy learning produces better results than explicit motor learning might be the fact that explicit motor learning has tendency to describe *movement norms*: *"*how one should move properly". Often this does not make the learning process easier for pupils, movement norms can have a limiting influence on pupils' natural capacity for moving and learning. Movement metaphors, on the other hand, are intended to trigger a movement sensation that pupils already possess. Daily life situations and activities form a valuable source for helpful movement metaphors.

Examples of analogy learning can be found in contemporary and historical music pedagogy. For instance, piano pedagogue Margit Varró advocates triggering movement sensations that facilitate playing gestures by means of analogies with daily-life activities (such as touching objects, walking, skipping and bouncing a ball) or suggestive motor imagery, such as asking pupils to imagine their lower arm is the beam of a balance scale (Varró 1929, 109).

How to apply movement metaphors effectively

There are a couple of things to keep in mind in order to apply analogy learning effectively. In the first place, a movement analogy should be **relevant** to the learner. In a study involving learning the forehand topspin stroke in table tennis, the analogy "draw a triangle with the bat and strike the ball as if you move up the diagonal side" was found to be an effective instruction, compared with traditional instruction involving literal movement rules (Liao and Masters 2001). This study involved Western participants. When the same analogy was used in a study involving inhabitants of Hong Kong, no advantages were found (Poolton, et al. 2006). However, when the instruction was changed to "move the bat as if it is traveling up the side of a mountain", the findings replicated those of Liao and Masters. Apparently, that analogy was more relevant for this group of learners. Teachers can (among other things) make sure of the relevance by letting their pupils find appropriate movement analogies **themselves** during the learning process.

In addition to paying attention to relevance, I recommend applying movement metaphors that **trigger a movement sensation**, rather than being a movement norm or movement description in disguise. For example, in piano pedagogy, it is a common instruction to hold your hands "as if you have an apple in them". Even though this instruction may look like a movement metaphor, in my perception it might function as a normative description of the shape the hands should have (according to the teacher who uses this analogy) whilst playing. On top of that, this movement metaphor describes a static function of the hands, rather than a dynamic function. Based on this, I assume it is unlikely that learning accompanied by this instruction will lead to the manifestation of the typical benefits of implicit motor learning. Rather, I expect that (for example) the movement metaphor to "move your hands like spiders and imagine that your fingers are their legs" will trigger a movement sensation within the pupil. Also, it describes a dynamic function of the hands. Therefore, I believe that this movement analogy is much more likely than the apple-metaphor to result in the advantages of implicit motor learning.

Movement analogies that trigger **familiar** movement patterns (i.e. movement patterns that pupils already "know") can be very effective. A music teacher can promote this by choosing useful movement metaphors derived from daily life activities. As an example, a piano teacher might use the movement analogy of finger drumming when impatient, in order to assist the learning process of fast runs.

Make sure to choose movement analogies that trigger **fine motor** reactions in pupils. For example, in piano pedagogy a popular movement metaphor for helping pupils to play short staccatos is to suggest that they pretend the keys of the piano are hot. Since the reflex movement of removing the hand from a painfully hot object is a gross motor gesture, I am not in favour of this movement metaphor. Rather, I recommend using analogies such as "imagine that you play upward, out of the key", which are in my view more likely to trigger a fine motor control gesture.

Lastly, pupils need to have clear ideas of the musical goals they are trying to achieve and preferably **focus their attention on these musical goals**. Pupils ideally focus on the musical sound they intend to produce, rather than on how they move, which will be substantiated in the next paragraph.

5.5.2 External focus of attention

Traditionally, motor skill learning is considered to start with a stage in which the learner exerts conscious control over his movement. Fitts and Posner have proposed three stages in the learning process of motor skills, namely the cognitive, associative and autonomous stage (Fitts and Posner 1967). In the cognitive stage of learning, movements are controlled relatively consciously: learners execute the skill in a "step-by-step" manner. Since learners may use overt or covert self-talk in this stage, Adams has labelled it the "verbal stage" (J. Adams 1971). Movements are typically relatively slow, not fluent and not economical in this stage. Both the movement pattern and the level of achievement are unstable. The associative stage of learning involves more subtle movement adjustments. Disadvantageous co-contractions (muscles that contract unnecessarily in a counterproductive manner) gradually diminish and movements become more reliable and consistent. Movements are controlled more automatically, thereby allowing for more attention to be directed to other aspects of performance. In the autonomous stage of learning, motions are fluent, economical and accurate. The skill is performed with little or no conscious control.

Human movement scientist Gabriele Wulf (2007) gives the following summary of the traditional view among practitioners (sport coaches, teachers) on motor learning for novices:

> *It is generally assumed that novices benefit from information about how to best perform a motor skill. After all, they need to get an idea of the correct movement. Therefore, the traditional belief is that learning during the early stages is enhanced when learners are made aware of their movements and of how they are performing in relation to the goal movement. To facilitate the learning process, instructions and feedback are typically given that direct learners' attention to various aspects of their movement coordination. That such instructions promote the use of conscious modes of control is not viewed as problematic, but rather as a necessary phase that the learner must go through in order to reach the stage in which movement control is more or less automatic. After all, the purpose of instructions and feedback that teachers or coaches give is to guide the learner toward the correct movement and to avoid the need to make changes in the technique later when the pattern of coordination has already become stabilized. But are these instructions really helpful? (G. Wulf 2007, 6)*

In recent years, many experimental studies have been done about the differential effects on motor learning and motor performance of an external focus of attention (the learner focuses on the outcome of his actions) in comparison to an internal focus of attention (the learner focuses on his movements). In this type of research, participants in the internal focus group typically receive instructions about movement performance that are generally considered to be “correct” among experts in the field of the skill in question. For example, in a study focusing on basketball free throws, participants in the internal focus group were instructed to focus on the “snap” (i.e. flexion) of their wrist during the follow-through of the throw, which is generally considered to be an element of correct technique among basketball coaches. Participants in the external focus group where told to concentrate on the centre of the rear of the basketball hoop (Zachry, et al. 2005). The outcome of this study was that participants who focused externally performed better in terms of accuracy and movement economy than participants who focused internally.

Gabriele Wulf (2007) has reviewed the results of recent scientific research about the differential outcomes of an external focus relative to an internal focus of attention. Based on this body of research she has formulated implications for practitioners (for example sport coaches, physical education teachers and movement therapists) in her book “Attention and Motor Skill Learning” (Wulf 2007). The overall image that emerges from the research results is that an external focus of attention is both beneficial for the instantaneous performance and for the learning process of motor skills, i.e. how well the trained skill improves during and is retained after training sessions. In other words, the adoption of an external focus of attention results in both immediate and long-term advantages. Additionally, adopting an external focus of attention has been demonstrated to enhance transfer to novel variations of the skill. Furthermore, the advantages of an external focus of attention have been shown to be generalizable across tasks, skill levels, and age groups. Lastly, individual differences between learners do not play a significant role in the relative effectiveness of an external versus internal focus of attention.

Instructions or feedback that direct learners' attention to the movement effect, rather than the coordination of their body movements, have been found to result in greater movement effectiveness, e.g. accuracy, balance and speed. For example, in basketball (Al-Abood, et al. 2002),

volleyball (Wulf, McConnell, et al. 2002), dart throwing (Marchant, Clough and Crawshaw 2007), and golf (Wulf and Su 2007), movement accuracy was enhanced by instructions or feedback inducing an external focus. Moreover, external focus of attention has been shown to result in increased movement efficiency, which can be observed in the form of reduced muscle activity, monitored by electromyography (the recording of electrical activity in muscles). In the process of acquiring a motor skill, typically less and less muscular energy is required as individuals learn to reduce unnecessary co-contractions and exploit passive forces (Gentile 1998). Instructing learners to focus on the movement goal appears to facilitate this increase in movement economy. Several studies have demonstrated that external relative to internal focus instructions, or no instructions, results in reduced muscular activity accompanied by greater movement accuracy (Zachry, et al. 2005) (Lohse, Sherwood and Healy 2010). Importantly, the benefits of external focus have not only been shown relative to internal focus conditions, but also relative to control conditions (i.e. the group of participants that received no instruction what to focus their attention on). This may support the notion that individuals tend to adopt less optimal (internal) foci by themselves, if not instructed to do otherwise. A remarkable finding in several studies is that even seemingly insignificant differences in instruction may lead to different learning outcomes. For example, in a study by Freudenheim et al. the effects of attentional focus on swimming speed were examined (Freudenheim, et al. 2010). Participants in the internal focus group received the instruction to "pull your hands back", whereas participants in the external focus group were instructed to "push the water back". Swimming speed was significantly higher in the external focus group compared with both the internal focus and control conditions. Thus, the minor difference in the wording of the instruction resulted in a significant advantage for the external focus condition. Finally, several studies have shown that focusing on one aspect of the skill (for example finger movements) can impact other components of the skill (for example leg movements). Put another way, an internal focus on one part of the body appears to have a more global influence on the motor system, hampering overall performance (Zachry, et al. 2005) (Wulf, Zachry, et al. 2007) (Wulf, Dufek, et al. 2010) (McNevin and Wulf 2002).

Wulf, McNevin & Shea (2001) have suggested the "constrained action hypothesis" to account for the better learning outcomes produced by an external compared to an internal focus of attention. According to the constrained action hypothesis:

> *[…] trying to consciously control one's movements constrains the motor system by interfering with automatic motor control processes that would "normally" regulate the movement. Focusing on the movement effect, on the other hand, might allow the motor system to more naturally self-organize, unconstrained by the interference caused by conscious control attempts—resulting in more effective performance and learning. (Wulf, McNevin and Shea 2001, 1144)*

Even though at that time no research involving musical skills had been done, Wulf and Mornell (2008) suggest that experimental findings about the influence of attentional focus on motor skill learning might have important implications for music pedagogy. According to Wulf and Mornell:

> *Teachers will ideally look for verbal instructions that direct attention away from small muscle movements or body, so that automatic motor programs are not disrupted by cognitive interference. At the same time, the externally focused music student will find and store an individual solution for a desired movement pattern implicitly – resulting in a "memory without a record" […] Thus, when teachers give instructions,*

they should describe the effect to be achieved, such as "the melody line should push forward and climb towards the climax" as opposed to the specific "strike the notes harder using finger muscle and increase arm thrust towards the end of the line"; or using an image such as "the accompaniment is like a peaceful ocean of sound" rather than "pull back your left wrist to prevent the fingers from reaching the bottom of the key bed." […] Teachers often attempt to fix students' technical problems by using internal focus instructions, but these problems have been seen to solve themselves when the right external goal is offered. [...] Therefore, musicians are better off imaging the effect they want create, not trying to control exactly how they achieve the effect, and they should attempt to hear [the] piece as a whole, not as the sum of its parts. (Wulf and Mornell 2008, 14-15)

The benefits of an external attentional focus have recently been demonstrated to apply for skilled musicians as well. Experimental research by Mornell and Wulf (2019) has shown that graduate and undergraduate music university students perform better in terms of both musical expression and accuracy, as a result of focusing on playing for the audience and the expressive sound of the music, rather than on the precision of their finger movements and correct notes (Mornell and Wulf 2019). Williams (2017) has investigated the effects of external focus on accuracy and confidence in conservatory students of natural trumpet. Her research has demonstrated a significant positive influence of external focus. Williams furthermore states:

The question for a musician is not "How does it work?" but rather: "What do I need to do in order for it to work?" A musician does not need to understand the workings of his muscles, nerves and neurons or to be instructed what movements to make (R. Masters 2012) (Wulf 2007) (G. Wulf 2013) (Wulf and Mornell 2008) but rather have an exploratory and holistic approach to practicing and performing in which their mind, body and emotions cooperate to get the best results. Ideally, the mind is concerned with external focus on musical elements (rather than with things like analysis, judgement, internal focus, comparison, worry about consequences, and distraction) in order to allow the body's implicit mechanisms to learn or remember the appropriate movement. External focus – or focussing on musical intention – can be informed by the emotions – i.e. the performer's own emotions (connected with the music) or the emotions embedded in the music. (Williams 2017)

How to trigger external focus within your pupils

Triggering external focus of attention within your pupils can (among other things) by achieved by means of listening assignments and goal-oriented feedback. The concept of listening assignments is explained in paragraph 5.1.2, goal-oriented feedback will be discussed in paragraph 5.6.2.

5.5.3 Facilitation

When music teachers apply physical contact in order to help their pupils to find a suitable posture or playing gesture, this is called facilitation or guided movement. It works in a similar way as the "helping hands" when you were learning to ride your bike: the learner feels what to do and is guided **without words**. It can therefore be considered a form of implicit motor learning. Once a successful performance has been reached, the helping hands are not necessary anymore.

Facilitation can be very effective but should be applied with care. In the first place, pupils should feel comfortable about this procedure. Also, the guidance should not be normative: it should not be

presented as “the proper way of moving”, since it would then have the same hampering effect as a normative, literal movement instruction. To get an idea how *not* to apply facilitation, please watch this video clip: https://www.youtube.com/watch?v=Xtz8Uky-BhY

5.6 FEEDBACK

In learning processes, feedback plays a central role. Feedback is information arising from actions. Learners have two sources of feedback: intrinsic (originating from their own senses) and extrinsic (from an outside source). As we have seen in paragraph 3.2 (the process of music production), musicians have two intrinsic feedback loops: they hear what they play and thus receive acoustic feedback, and they feel what they do, thus receiving tactile and proprioceptive feedback. In music lessons, teachers may provide their pupils with additional, extrinsic feedback. This feedback will be discussed in this chapter.

Recent scientific research has shown that the way in which teachers give feedback, is very influential on the outcome of the learning process. One of the pitfalls for music teachers is giving feedback too quickly and too frequently, thereby taking away the opportunity for pupils to develop their aural skills. Also, pupils are easily overwhelmed if a teacher gives too much feedback, a “system overflow” might occur, which hampers learning. In contrast to this, teachers had better to reduce and delay their feedback, and to let pupils give feedback to themselves. In the following paragraphs, five ways of giving feedback that have been shown to be effective will be described.

5.6.1 Specificity of feedback

Feedback is most effective when it is specific. This means that teachers ideally are clear about *which* aspect of the music they are addressing, in *which* part of the piece, and *what* they have to say about it. This applies to both positive and negative feedback. Non-specific positive feedback (for example to say “well done” without specifying what was well done) has a risk of being meaningless to pupils. Non-specific negative feedback, for example “Your rhythm was not right”, has a risk to confuse pupils. Here are examples of specific positive and negative feedback. Translate the third and fourth example into specific feedback yourself.

Type of feedback	**Non-specific**	**Specific**
Positive	*Well done*	*I heard that you played bar 29 with a clear pulse now*
Negative	*Your playing sounds like soup*	*I heard that you mixed the sound of several chords in the pedal*
Positive	*You sound more articulated now*	
Negative	*You sound too heavy*	

Table 6 - Specificity of feedback

Non-specific feedback can be given *deliberately* by music teachers, in order to activate their pupils. When this happens, feedback takes place in the form of a "puzzle". Here are some examples:

- *I heard there was something missing in your articulation in this bar. Can you find out which articulation mark you missed?*
- *I heard that your melody sounded on the background somewhere in this phrase. Can you find out where?*

As an exercise, please translate the following feedback into a puzzle:

Specific feedback	**Puzzle**
This note should be an F-sharp, you played an F-natural.	
You forgot to change the pedal here.	

Table 7 - Deliberately non-specific feedback

5.6.2 Goal-oriented feedback

Feedback can be aimed at the outcome of the action (goal-oriented feedback) or at the way the action is performed (movement-oriented). In case of goal-oriented feedback, music teachers say something about what they hear, in case of movement-oriented feedback they say something about what they see. Movement-oriented feedback has the danger of inducing an internal focus of attention in the pupil, which has a negative influence on both his current performance and the learning process (see paragraph 5.5.2 about external focus of attention). With goal-oriented feedback you can encourage your pupil to adopt an external focus of attention. Below are some examples of both movement-oriented and goal-oriented feedback. Translate examples three and four into goal-oriented feedback.

Movement-oriented feedback	Goal-oriented feedback
You should raise your fingers more	*You can sound clearer by making less overlap between the notes*
You had too much tension in your shoulders in this fortissimo passage	*The piano sounded forced in this fortissimo passage*
You lifted the pedal too early here	
You should play the keys more deeply in this soft passage	

Table 8 -Goal-oriented feedback

5.6.3 Descriptive feedback

Feedback does not necessarily have to be given in the form of an opinion. When teachers **describe** what they heard, this is also feedback. One of the advantages of descriptive feedback is that there is less risk for negative emotions and defensive reactions by learners. Also, it might be easier for learners to change their performance based on descriptive feedback, since they do not have to "filter out" the teachers' opinion in order to get an idea of what to change. Here are some examples, translate example three and four into descriptive feedback yourself:

Feedback in the form of an opinion	Descriptive feedback
I liked your rhythm in this run	*I heard that your rhythm was smooth in this run*
I found these chords too heavy	*I heard that these chords sounded stronger than the previous sentence*
Your legato was not good in this phrase	
You did these staccato's really well	

Table 9 - Descriptive feedback

5.6.4 Delayed feedback

Please watch the following little video clip. It is an excerpt from the movie "Amadeus", in which the Emperor practises and Salieri provides the Emperor with feedback:
https://www.youtube.com/watch?v=GvZTUHqiAC0

Research has shown that feedback given *during* the performance has little or no long-term learning effect (Wulf and Mornell 2008). Wulf and Mornell furthermore state:

> *Moreover, as explained above, judging performance simultaneously, or giving feedback immediately afterwards, may actually hamper learning for a number of reasons: the processing of performance is disrupted, resulting in poorer mental representations; the student does not learn to judge his or her own performance; and movement stability necessary for motor learning is reduced. It should also be kept in mind that the performance being evaluated is only a temporary result and not necessarily a sign of learning. Thus, the student receives feedback that may be confusing or counterproductive to the learning process. In contrast, using feedback sparingly, and*

providing it only after the learner has had a chance to process his or her intrinsic feedback, could result in more effective learning. (Wulf and Mornell 2008)

5.6.5 Self-feedback

Self-feedback means to let pupils give feedback on their own performance. This is also called reflection. Self-feedback is a very powerful tool for developing the ability to listen, analyse and think. It consumes more lesson time than feedback provided by teachers, since pupils generally take a bit of time to think and formulate their answer. However, it is an investment that pays dividends: pupils get better at listening to their own playing, which enables them to practise more effectively.

It is advisable to keep self-feedback very specific in early stages of musical development. For example: the question "Which aspects of your playing do you think can be improved" is too open for beginning pupils. Instead, more closed questions are better, for example "How was the fluency of your performance?". More advanced pupils are often capable of evaluating their performance without prior points of attention given by their teacher, which makes open questions usable.

Here are some examples of self-feedback. Please translate the last two points of attention into self-feedback instructions.

Point of attention	**Self-feedback instruction**
Legato pedalling	*Did you hear "gaps" or connections between the chords?*
Balance between melody and accompaniment	*Could you hear the melody on the foreground throughout the whole phrase?*
Progress since previous lesson (advanced)	*Which aspects of your playing have improved since the previous lesson?*
Points for improvement (advanced)	*Which aspects of this piece could be improved?*
Clarity of articulation	
Clarity of accentuation	

Table 10 - Self-feedback

The "Pick-your-favourite" exercise (see paragraph 5.1.4) is also an application of self-feedback. If music teachers predominantly apply self-feedback, their teaching style is called "coaching". Here you can see an example of a lesson fragment in which coaching is applied:
https://www.youtube.com/watch?v=mEFMpjjBECY

In the "error-analysis approach", an error is a source of information. Teachers ask their pupils about their perception of what went wrong. Before trying it once more, pupils should try to indicate precisely what they thought went wrong in terms of the outcome of their playing. In order to reach the appropriate level of precision in the analysis of the error, teachers can apply follow-up questions. Here is an example dialogue:

Teacher: *Did you notice that you forgot to do an articulation?*

Pupil: *No, I didn't.*

Teacher: *Please play this passage once more. Listen for the articulation*

Pupil: [Plays the passage again] *Ah, now I noticed it. I forgot these staccato's*

Teacher: *Did you forget all of them, or only some?*

Pupil: *Let me try it out once more...* [Plays once more] *I think I forgot these three staccatos*

5.6.6 Negative feedback

Please watch this video clip: https://youtu.be/upjeSEx6mnw

Negative feedback can have a positive effect, if teachers apply it in a functional way. There are two rules of thumb:

- Be specific
- Immediately translate it into feasible steps for improvement.

If this not possible to adhere to these rules of thumb, don't give negative feedback.

5.7 THE LAW OF EFFECT

The law of effect applies to behaviour of animals, including human beings. It was formulated by the psychologist Edward Thorndike. Thorndike states that "responses that produce a satisfying effect in a particular situation become more likely to occur again in that situation, and responses that produce a discomforting effect become less likely to occur again in that situation" (Thorndike 1898). For example, a pigeon accidentally pushing a lever and receiving food as a result of that, is likely going to repeat this behaviour. Please watch this video clip:
https://www.youtube.com/watch?v=X7JTB_B11uE

It is possible to apply this law to the learning process of perceptual-motor skills, more specifically to learning to play a musical instrument. Here is my translation of the law of effect into a recommendation for music teachers:

> *Every instruction or exercise should lead to an improvement of the musical result which is perceived by your pupil. If the pupil hears that his playing sounds better, it will be easy for him to remember the improved motor performance. As a rule of thumb, when it sounds better, it is good. When it feels easier, it is good. Generally, they both happen at the same time.*

6 CHECKLIST PIANISTIC QUALITY

The aforementioned information might be overwhelming and therefore difficult to put into practice. In order to make it more manageable, I have created an overview of steps that you might take in the guidance of a pupil who is learning or improving certain pianistic skills. I present it to you in the form of a "checklist": a list of questions that you can use in order to find out whether all the conditions and prerequisites for learning are present. Please look at the checklist on the next page. Below I will explain the five questions of the checklist one by one.

1. **Does the pupil have a clear musical imagination of the sound he is trying to produce on the piano, or the improvement he is pursuing?**

If not: Enrichment or clarification of the musical imagination of the pupil is necessary. Apply demonstrations, musical metaphors and/or clarifying activities.

2. **Is the pupil listening in a focused way to the aspect of pianistic quality he is learning or improving?**

If not: Apply listening assignments, listening questions and/or feedback.

3. **Does the pupil have a functional fingering?**

If not: Let the pupil find a better fingering himself or present him with a better fingering.

4. **Does the pupil apply in-between steps that assist the learning process?**

If not: Create meaningful in-between steps. Practise these with the pupil in the lesson, so that he can apply them independently whilst practising.

5. **Is the pupil practising effectively?**

If not: Practise the practising in the lesson. Make sure the pupil has a clear learning goal and knows which practice strategies connect to this goal. If the answer to all the above questions is "Yes", then you know all the conditions for optimal learning are present. In case the pupil still needs some help in translating his musical imagination into a suitable playing gesture, you can apply a movement metaphor, facilitation or a "practical tip" how to do it.

Figure 7- Checklist pianistic quality. Created by the author.

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