

The Intentions of Piano Touch

Jennifer MacRitchie,^{*1} Massimo Zicari,^{*2}

^{*}*Divisione Ricerca e Sviluppo, Scuola Universitaria di Musica - SUPSI, Conservatorio della Svizzera Italiana, Switzerland*
¹jennifer.macritchie@conservatorio.ch, ²massimo.zicari@conservatorio.ch

ABSTRACT

For pianists, touch is a corporeal tool that can be used not only to physically produce notes on the piano, but to mediate their expressive intentions for the performed music. This paper directs attention towards the cognitive decisions that result in these performed gestures, generating different types of touch for the pianist. An open-ended questionnaire concerning piano touch technique was sent to piano tutors from European conservatoires. Written or verbal responses were required, for the latter the questions formed a semi-structured interview. Results conclude that “touch” originates in the pianist’s musical intention, an intuitive response to the timbre of sound or specific mood they are trying to project, often manifested through the use of imagery or metaphor. Connecting intention to physical gesture, along with parameters such as weight and point of contact on the finger, the main concern for pianists is control of tension within the limbs, this helping to create different types of sound. A case study was examined where a professional pianist performs two pieces of different styles with two different sound intentions. Shoulder, arm and hand motion is recorded via video-camera with a side-view of the pianist. Results show that touch is heavily based on musical context with movement and tension within the shoulder-arm-wrist system changing based on musical intention. With the basis of touch rooted in conscious musical expression, this study provides a starting point for which to explore the connection between the conscious choice of the performer and the resulting physical gesture.

I. INTRODUCTION

Piano touch technique not only describes how to physically play notes on the piano but is also a tool allowing the mediation of performers’ expressive intentions for the music through a personal relationship between body and instrument (Dogantan-Dack, 2011). It is suggested that the uniqueness of this relationship is pivotal for the performer regarding how the timbre of a note is produced. This kinaesthetic sensation of producing notes with a particular timbre is then tied to performers’ perceptions of these notes (Galembó, Askenfelt and Cuddy, 1998). This suggests that pianists’ own perceptions of timbre arise from more than purely the sound produced but also the ‘feel’ of how the key is depressed.

Suggesting that pianists use this tactile information to control aspects of their performance, Goebel and Palmer (2008) found that pianists made a particular kinematic landmark in their movement towards the keys at the point where the finger initially touched the key, and that presence of these landmarks increased with increasing tempo. These results suggest that the tactile information present at each keystroke enables the pianists’ time-keeping. Audio information also provides a more common feedback tool for pianists, determining the properties of successive keystrokes (Furuya and Soechting, 2010), with tempo and dynamics showing correlates with finger movement properties such as finger height in note preparation (Dalla Bella and Palmer, 2008).

The comparison of curved and straight fingers demonstrates another use for touch technique for controlling efficiency of movement in performance (Parncutt and Troup 2002). It is noted that curved fingers are used by pianists in order to play loud passages more efficiently, as the curvature allows an increased force to be available at the fingertip. Studying expert pianists’ arm joints as they performed “pressed” and “struck” notes found variation in the rigidity of the different joints (Furuya, Altenmüller, Katayose and Kinoshita, 2010) also noting that shoulder motion in “struck” touches helped to increase the angle of the finger relative to the key. Inter-subject differences in force profile when varying the loudness of these “struck” tones were attributed to differences in overall mass of the performer (Kinoshita, Furuya, Aoki and Altenmüller, 2007). This may confirm Dogantan-Dack’s proposal (2011) that it is this personal relationship and how the performer controls his/her whole body that makes a difference to the sound. Audible differences in the timbre produced by these “struck” and “pressed” touches were found, however, these likely arose from the finger-key noise produced before the onset of the note (Goebel, Bresin and Galembó, 2004).

From the pianist’s point of view, a lot of concentration is given to producing the intended “sound”. Munoz (2007) postulates that performers create relationships between gestures and intended character, quality or even intensity of sound. In this way, the movements that performers make become a link to the intended sound of a note or group of notes. Looking at hand movements created during a professional pianist’s performances of Beethoven’s Bagatelles, Davidson (2007) discovered that various “lifts” and “flicks” occurred at the same expressive locations across performances. The function of these gestures was difficult to separate out as being either functional (purely in order to physically play the note) or expressive (a movement that adds something extra to the note or group of notes being played) but the fact that they occurred in the same place suggested that these movements were being made intentionally to express a certain feature. In terms of what information this communicates to the audience, what this expression means for the pianist and the audience could potentially be different things (Munoz, 2007). However, Parncutt and Troup (2002) suggest that the visual perception of a note may influence how the audience perceives its “sound”.

Thus, the movement of the hands and body of the pianist as they approach the keys is a pivotal consideration when thinking about the produced sound and its connection to the pianists’ expressive intentions. Although current studies have shed light on the kinematics of the fingers and arm as they approach the keys, there is a missing connection between these movements and the expressive intentions that they are designed to fulfil, not to mention the pianist themselves. This study turns towards the cognitive decisions of the pianist, and how this translates into physical gestures aimed at fulfilling different sound intentions.

Pianists are often required to use a spectrum of different touches in order to express certain sound intentions, and it is not immediately clear for those learning to play, how to achieve this range, or when and how to use it. To make this picture more complex, the diverse French, Russian and German piano schools demonstrate some of the different existing attitudes towards interpretation and technique (Lourenço, 2010). Other texts such as Matthay's "The Art of Touch in All its Diversity" (1903) also prescribe certain techniques such as avoiding unnecessary movement, as well as recommendations of how to approach the keys to produce different sounds. However, piano pedagogy has generally advanced from older theories where the fingers were considered separate entities in comparison to the other parts of the body, to newer Gestalt theories where the fingers are considered part of a larger movement originating in the arms, elbows and wrists. These newer methods concern themselves with the correct weighting of each part of the arm so that the fingers have the strength to play the keys.

To understand in depth the cognitive processes of a pianist when they make these different types of touches, we must first look at the teaching mechanisms in place today, and the common themes and concerns of current performers. This research aims to discover the generative processes behind pianists' different touches; what the performers' intentions are and their connections to the resulting gestures.

II. METHOD

An open-ended questionnaire concerning piano touch technique was sent to piano tutors from European conservatoires. The questions were very general, covering the aims and methods of the participants concerning piano touch, and also exploring how the participants learned these specific methods themselves. The questions are included in the Appendix.

A. Participants

It was decided to use piano teachers from conservatoires as teachers will have had to reflect on their methods for achieving different sounds from the piano, and will have had more opportunity to verbalise them in communication with their students. Nine responses were received from different European institutions of mainly British participants (4) but also included Italian (2), Brazilian (1), Argentine (1) and Slovenian (1) with ages ranging from 32-73. All participants had distinguished performance careers as well as teaching experience.

B. Analysis

Written or verbal responses were required, for the latter the questions formed a semi-structured interview conducted either in person or via the Skype VoIP application. The interviews were recorded and then transcribed verbatim.

All written and transcribed responses were coded by two independent judges, according to an agreed coding structure that became evident after an initial coding stage of the collected data.

III. RESULTS

The purpose of this particular study within the larger project of piano touch investigation was to elucidate the general opinions of current piano teachers and examine commonalities among particular technical methods, as well as the origins of these methods. For this reason, general categories have been defined from the coding process, and although some attempt has been made to quantify these, the results simply focus on providing an overall impression of these techniques.

Responses ranged from very detailed technical descriptions of how one would achieve a certain type of sound, to those who only discussed piano touch in terms of general strategies. Despite this, some commonalities emerged. There were five emergent categories from the coding process; the first four arose from the questions concerning aims and methods, with the fifth category determined from questions about the origins of these methods. The main categories were defined as follows: (i) Musical Intention, exploring how the musical context and desired sound qualities affected how the pianists approached the piano and the images/metaphors used by pianists to achieve them, (ii) Holistic View of the Body, which encompassed certain aspects of feedback and sensory information a pianist uses in performance, as well as their views on the body as a whole and its relationship to the piano (iii) Position, describing the position of the different parts of the body with reference to the piano, or particular formations of the hand, arm or shoulder and (iv) Quality of Movement, describing movements of these different body parts and their properties. The final category (v) Origins, describes how the participants developed their technique.

Each of these main categories has corresponding subcategories, which go into further detail of the properties of each. The subcategory names along with the number of participants providing material under each subcategory is shown in Table 1, giving an overview of the substance of the responses.

C. Musical Intention

Nearly every instance of movement description in these responses begins by clarifying the musical context in which it occurs, and also the musical intention that the performer starts with, making these two subcategories pivotal when considering different piano touches. Responses also either detail a distinct quality of the sound the pianists aim for, or describe uses of imagery and metaphors to achieve the desired sound.

1) *Musical Context*. This subcategory covers material from seven participants that mentions specific repertoire, or even different styles or genres of music that may involve differences in the way pianists would approach the issue of touch. It became clear that differences in movement and piano touch are highly dependent on the music being performed. This is reflected in the following responses:

"Well the thing is that the touch that you choose to make is informed by whatever musical decision you've made that's behind that. Before you start playing, that you've made a kind of decision about the kind of sound that you want. Or it might not even be the kind of sound that you want but it might be the kind of mood that you want."

“Yeah you know there are different ways of working musically and technically, different composers. I mean you can’t play Mozart without knowing Bach, you can’t play Prokofiev without knowing Mozart. So every piece has a different kind of difficulty and you know for playing very very good way Mozart or Bach you need good fingers, but you need very creative way of, as well, and Chopin is something different and Liszt is something different.”

2) *Sound Qualities*. The seven participants responding within this subcategory describe the qualities of sound the performers are aiming to produce. This is strongly related of course to the musical context, but also can describe properties or characteristics of the sound the performers want to achieve. This sound the performer wants to achieve often determines the movements they consequently make, with responses showing that the image of the sound is the starting point, with the technical movements following:

“Given that the ‘touch’ is the last thing that happens before the sound emerges from the instrument, it’s vital that it corresponds with an expressive impulse, i.e. one must ‘think’ the sound in advance of making it.”

“The first idea of bringing the most beautiful sound of each kind of piano and the second idea of thinking the piano as an extension of my body helps me to build my piano touch in each piece of music. Actually I do not think about (or I am not so aware about) the movement of my hand before having the sound I want. First I play and try to find the exact piano touch (sound) I want and then, I will have an idea of the movement I need to do with my hands, my arms or my body.”

These results confirm that musical context, or the sound one wants to achieve plays a large part in shaping the movement of the performer. The first thoughts the performer has when approaching the piano considers the qualities of sound they would like to produce, and how this will fit into the musical context. The movements or gestures that follow are produced in order to achieve these sounds. This would rely heavily on a strong connection between the performer’s conscious choices, their resultant physical gestures, and the qualities of the produced sound, something that may be developed over years of piano practice and performance.

D. Holistic View of Body

The participants’ views on the body itself follow the Gestalt form of thinking, considering the upper body as a whole system rather than as separate parts. Surprisingly, the piano as an extension of the body is not mentioned very frequently, although themes of embodiment in the way the body reflected certain aims for the sound can be discerned. Individual differences is also a frequently occurring theme, with teachers stating that all of these movements depend on the actual pianist. The feedback mechanism that performers use to continually assess the sounds they are producing is also described in several ways. As well as the classic form of listening, responses also describe “feeling” the keys, i.e. using tactile feedback to control aspects of their playing, but also describe a deeper sense of “feeling” the character or mood.

1) *Hand-Arm-Shoulder System*. This subcategory is defined as describing the relationship between different parts of the arm, and how they work in tandem to produce the end gesture. As

one response from the material of eight participants demonstrates:

“So whatever you’re doing with your fingers and your hand goes to your arm, is connected with the arm, and of course it’s all connected with the body as well. Which will, the way the body is, will give you the movement in your arm, or sometimes make the arm less moveable.”

This view of the whole body being involved in piano touch is also considered in terms of efficiency of movements, and having the right amount of energy necessary to play a particular piece:

“But it’s a bit like if you were an athlete and you were going to run from A to B you would run from A to B. If in the middle of that run you were going to do a leap over a high bar, then the way you run will be different. So the messages you are sending to your muscular system, and it’s your whole muscular system, is that you, so you need more energy, or you need more something to do that particular thing. So it’s really about using the right amount of energy, no less amount of energy and no more amount of energy that you need for say two pages of octaves. You’re not going to approach two pages of octaves the same way you approach an adagio piece. So it’s the whole body that gets ready for these things, but at the end of it all, at the of all these approaches is your fingers making it happen. Your fingers and arm and body.”

2) *Individual Differences*. This subcategory reflects the material from five participants that considers each pianist as different, therefore moving in different ways, and potentially having different approaches to piano touch. An example of this follows:

“...for some pianists the movements above work also in ff. For others it is better to hold the hand always in contact with the keyboard and to move the arm up and down. I notice by some pianists that they move the whole system hand-arm up and down in such passages; I don’t play in this way and I don’t advise my students to play in this way; however, I am sure that for some pianists (I would say those with short arms, but I have not enough experience for being sure) this could be the best solution.”

Individual approaches to the piano are also described as an attribute responsible for audible differences between performers, even when playing the same piece:

“So you’re working I suppose first of all with that, then behind it is your body, your whole body, and it’s possibly the, it’s the body that makes the changes, you are the one that can make the changes. But if you talk to a wind player or someone that’s not a pianist, they find it very difficult to understand how six pianists can come on and play the same piano, and they might even play the same piece, and all six pianists will make a different sound. So what does that imply? That implies a different approach from the whole person doesn’t it?”

Addressing the performer’s body as a whole system that can also be subject to individual differences, this reflects the view that it is this personal relationship with the piano that can produce different sounds. Following on from suggestions by Kinoshita et al (2007) stating that the differences in overall mass of the performers’ bodies may be responsible for different movements and therefore different dynamics, we suggest that each performer’s own movement profile and how they control

Table 1. Categories and subcategories defined in the coding process. These categories are ordered in terms of the themes they address, starting with the Musical Intention and how this leads to the Quality of Movement. Origins and Methods are listed below this. In each category, the subcategories are ordered according to the number of participants providing material on this topic.

Category	Subcategories	Number of Participants (out of 9)
Musical Intention	Musical Context	7
	Sound qualities	7
	Visualisation/images	3
	Metaphors	2
Holistic View of Body	Hand-arm-shoulder system	8
	Feedback	5
	Individual differences	5
	Listening	3
	Awareness	2
	Piano as an extension of the body	1
Position	Position	6
	Flat/curved finger	4
	Pad/tip contact point	4
Quality of Movement	Firmness	7
	Independence	6
	Relaxation	6
	Movement	5
	Velocity	4
	Weight	4
	Control	3
	Flexibility	3
Origins/ Methods	Influence of teachers	7
	Personal experience	6
	Piano schools	3
	Book references	2
	Intuition	2
	Piano method/ exercises	2
	Common sense	1
	Influence of other performers	1

each limb may be responsible for these differences in sound. This also extends to the feedback mechanisms they use to “check” their performance. The use of both tactile and auditory feedback allowing performers to modify their actions may rely heavily on the previous experiences of the pianist.

E. Position

Despite touch being a complex subject dependent not only on musical context and intended sound but also individual differences between performers, many responses provided technical material according to how these different touches might be formed. The position category refers to any instance where a type of arm, hand or finger position or formation is specified. Only four teachers explicitly mention the flat or curved fingers that so dominate the literature, with as many considering the contact point of the finger, with differences discussed between the pad of the finger and the tip of the finger.

1) *Position.* Position of the whole body and its relation to the arms and wrists is a common theme among six participants. It is most often used to describe positions that would enable the performer to make the sounds they desired, but also is used to describe strategies for directly achieving different sounds, as seen from these two participants:

“..movements and positions of hands and arms make easier to obtain certain kinds of sound and very difficult, if not impossible, to obtain other sorts of them.”

“I use a range of hand positions according to tempo, dynamic, tone, etc... Another important aspect of playing for me is the difference that even the tiniest adjustment of finger position can make to fluency, or the tiniest difference in the hand position.”

Many positions of the hand and wrist are also described with the adjective “relaxed”, suggesting that whatever position the pianist adopts to play, it must be relaxed and in such a formation that the pianist has the freedom to play. When mentioning ranges of hand positions, pianists appear to be concerned with the point of contact between the finger and key, the angles of curvature of the fingers that form the hand position, and its relationship with the wrist and arm. This position will allow the whole hand-arm-shoulder system to move freely in order to create their desired sound.

F. Quality of Movement

This category refers to movements of upper body parts, as well as the properties of these movements. Responses mention the requirement that individual fingers be independently controlled, which, along with seemingly contrary ideas of the body as a whole system and the fingers working together with the hand and arm, reflects a balance that is needed between the movement of the body as a whole, and the movement of its separate parts. Although the control of weighting each part of the body is discussed, the major themes focus more on the aspects of firmness or relaxation that each part of the arm may need for specific sounds and also for piano playing in general.

1) *Relaxation.* This movement property is mentioned by six participants, all stressing the importance of a relaxed hand, or relaxed fingers. The following participants discuss relaxation as an ergonomic quality required to physically be able to play the piano in the most comfortable and efficient way possible.

“My aim is always to find the most physically relaxed way of achieving the desired end result.”

“...being physically balanced and centred, relaxed across the upper chest, arms free to hand.”

“...at a height which allows the forearm to be roughly horizontal with keys when shoulders are relaxed.”

This quality of relaxation is also described as affecting the sound produced. This particular effect is covered more in the next section on firmness:

“in order to obtain a lot of sound, you have to relax.”

2) *Firmness* To some extent, this property is related to relaxation, and reflects the range of rigidity that pianists may apply to different parts of the arm to achieve certain results. In this way, this subcategory is more specific in terms of which parts of the body should be relaxed or firm.

“Very often I apply a quite firm finger touch with a relaxed wrist for a clear and sonorous sound.”

“Well if you attack the piano with an arm that’s completely tense then it’s a bit like taking a hammer and shoving it on a key. Actually it is like that. So if you want a hard, metallic, percussive sound that is what you would do.”

When discussing the qualities of movement, the relaxation of the body and varying firmness of the parts of the arm involved in sound production appear to have an effect on the produced sound. This supports results from the kinematic studies of Furuya et al.(2010) demonstrating that pianists vary the rigidity and dynamics of interacting joints when performing different sounds.

G. Origins/Methods

Looking at how these methods and strategies are developed, the majority of responses cite the relationship between the pianist and their former teachers as well as personal exploration. Few participants mention any kind of literature, including those defining the European piano schools, but rather imply that it is a visual demonstration that is most effective when communicating this type of information.

1) *Influence of Teachers.* This subcategory is self-explanatory and reflected material from the seven participants mentioning their previous teachers as having a positive influence over how they learned to play. This teacher-student relationship appears to be responsible for a large part of how the participants came to their own realisations about piano touch. Also, the visual aspect of this relationship has a heavy influence, as stated from these two participants:

“ I think piano playing is an art based oral tradition. This knowledge is better passed from teacher to student...Books always miss the most important thing: a person who is able to show what is saying”.

“My second Conservatoire teacher had a phenomenal range of sounds and a matching armoury of varied touch, from the incredibly relaxed hand to great rigidity, and a matching dynamic range and tone – one learnt through observation with him rather than through any verbal explanation.”

2) *Personal Experience.* Six participants suggest that the teacher-student relationship only took them so far, and that personal exploration and experimentation with touches and sounds helped them to cement their own theories.

“Much else has come from twenty-plus years of trial-and-error and deduction, both from my own playing and in teaching.”

“It’s just experiment really. I have done experiments in my piano technique class with creating a slightly flatter fingertip and the sound that that tends to create is very much more cantabile and beautiful.”

What becomes clear from these results as a whole is that there is no one solution on how to approach the piano, and how to physically touch the key. A large majority of this depends on the performer themselves, not only their physical attributes but also their personal relationship with the piano and how they “feel” the key as it is pressed. Touch also depends highly on musical context. As simple as it is to state that a finger must be curved in a certain way, and have a degree of firmness to produce a particular type of sound, the movements of the hand and fingers may be constrained by the notes they have to play e.g. consecutive octaves for the right hand. In this case, the whole hand may be forced to employ a certain movement in order to make sure the note in question receives the right treatment to produce the sound desired. Even though a large number of pianists frequently consider the hand as part of a larger system in the upper body, the individual fingers must still be controlled to a point where they can produce separate sounds. This may be required when playing a chord in which a note of the main melody is nested. Being able to balance several notes within the one hand implies that the physical formation of the hand as a whole may include these other musical considerations and not just the position required for the main melody. Generally, the qualities most frequently mentioned for movements are position, relaxation and firmness. This suggests that the formation of hand positions related to wrist-arm-shoulder positions and the range of tension within these limbs are what gives pianists this range of piano touches. As the focus of these results rests heavily on concerns of musical structure and intended sound, a case study was conducted examining a performer’s piano touch in two different pieces of music. This will explore the differences in touch when viewed through these different musical concerns.

IV. CASE STUDY

A case study was conducted where a professional pianist was asked to perform two musical extracts with two different sound intentions. Movement was recorded from a side-on view, capturing the fingers, hands and arms as they performed the musical excerpts. The pianist had blobs of UV paint applied to the joints of their fingers in order to aid the extraction of these positions from the still images of the video. Examining the differences between sound intentions for the same excerpt, we can explore the nature of movements made and their properties as defined from the above-mentioned results of the questionnaire, particularly in the subcategories of relaxation, firmness and position.

H. Case Study Method

The pianist was asked to learn two pieces of standard piano repertoire over a period of two months, Schumann’s Traumerei Op.15, No.7 and Bartok’s Mikrokosmos No.112 (Variations on a Folk Tune). These pieces had been chosen to represent different composer styles.

The pianist was then asked to perform the first section of each piece with two different intentions for the sound (i) *dolce cantabile*, i.e. in a sweet, singing style and (ii) *deciso marcato*, i.e. decisive and pronounced. For each intention, the pianist was asked to keep the tempo and dynamics the same where possible. Each intention was recorded once, with the pianist given practice time before each take.

For this study, the movements were recorded via a Panasonic HDC-SD90 camera at 50 frames per second, positioned with a side-view of the pianist. This captured the shoulder-arm-wrist movements along with the more detailed movements of the fingers, with detection aided by the passive paint markers applied to the finger joints. MIDI information was also recorded via a MOOG piano bar, a device designed to sit on top of any 88-key piano and extract MIDI information through the detection of infrared beams. Audio was recorded through a stereo pair of microphones. This paper, however, will simply examine the differences in movement between the two intentions for each piece. Further examination of other pieces and other intentions, along with movement analyses that relate to the tempo and dynamics analyses will be performed at a later stage.

I. Case Study Results

On visual inspection of the videos for each intention, differences in rigidity and movement were apparent. For the Bartok piece, we have selected a passage where the right hand plays consecutive sixths and the left hand joins in in canon. This part of the score is shown in Figure 1 with the extracted video frames of the performances shown in Figure 2. Frames were extracted in order to show the approach to, depression, and release of the key for the observed note of the performance. For the Bartok piece, this note in question is the top F occurring on the first beat of the second bar. Lines for each joint are shown demonstrating the position of the upper arm and forearm, and these are connected along the points of the blobs of paint on the

pianist's fingers. In each case, the fifth finger on the right hand is the object of observation as it plays a note, and so the black shape within these joints demonstrates the angle of curvature in the finger.

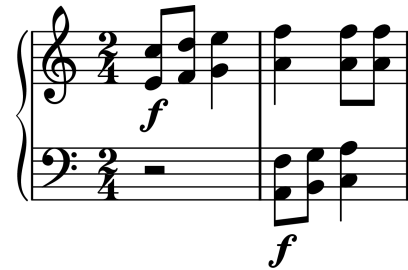


Figure 1: Bars 9 and 10 from Bartok's Mikrokosmos No.112. The note under consideration is the top F crotchet on beat 1 of bar 10.

As a technical consideration, the pianist needs to keep her hands steady in order to play these consecutive sixths accurately. Looking at the right hand movement, we can see for the *dolce cantabile* performance in the upper row of frames that the hand stays in a flat, rigid position, moving only vertically for the depression of the key. This applies also to the fifth finger, which does not change much in its curvature on the approach to, and release of the key. For the *deciso marcato* performance seen in the bottom row of frames in Figure 2, we see a greater flexibility in hand and arm, initially approaching the key from a greater height and sinking into the key as it is depressed with a joint movement of the upper arm and forearm. The finger itself approaches the key in a more vertical manner than in the previous example, with the angle between the finger and the key increasing slightly as the key is depressed, so that the finger is in a more vertical position. It is suggested that this action will achieve a louder sound for the pianist, and the more rigid controlled action in the *dolce cantabile* may be to control the volume and articulation of notes for these consecutive sixths.

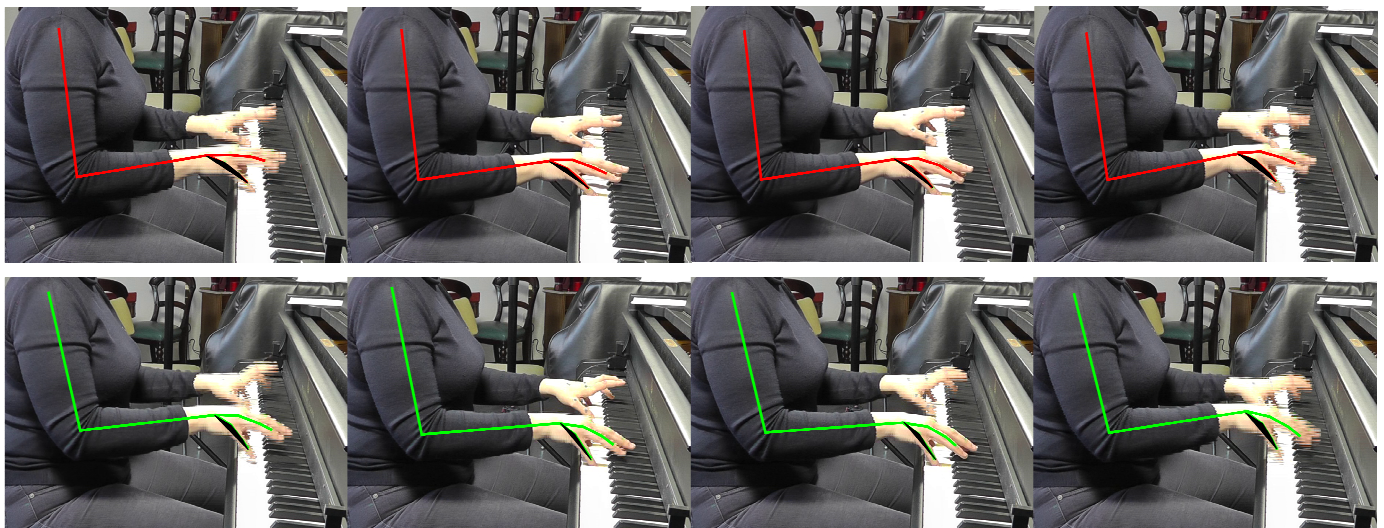


Figure 2: Top row shows frames taken from the first right hand chord in bar 10 of the Bartok Mikrokosmos No.112 performance played “*dolce cantabile*”. Bottom row shows frames taken from exact same chord in the Bartok performance played “*deciso marcato*”. The first frame in each row shows the movement approaching the key, with the second frame showing the point of contact with the key and the third frame showing the last moments of the key being depressed. The fourth frame shows the release of the key.

For performances of Schumann’s *Traumerei*, we focussed on the second top F of the first phrase. This can be seen in the score extract shown in Figure 3 and the recorded video frames for this note in Figure 4. Again the top row are frames extracted from the “*dolce cantabile*” performance and the bottom row are frames extracted from the “*deciso marcato*” performance. Again, the fifth finger is used to play this note, however, the hand this time is not as technically restricted as it was for the sixths in the Bartok.



Figure 3: First two bars of Schumann’s *Traumerei* Op.15 No.7 with the anacrusis. The note under consideration is the top F minim in beat 2 of bar 2.

Again we see the hand begin with a similar flat position as for the corresponding *dolce cantabile* in the previous example. This time however, as the key is depressed, the elbow and wrist move forward, allowing the hand to curl under and the finger to release the key in a more vertical position. The *deciso marcato* example in the lower rail of frames demonstrates a more rigid arm-hand combination, with the majority of movement being in the vertical direction and the hand maintaining its high arch shape.

These two examples demonstrate the importance of musical context, not just for the technical considerations of the notes being played, but also the style of composer. It is possible that the Bartok “*dolce cantabile*” inspires more rigid movements with flat hands close to the keys, as it is a piece that requires separated notes, and not a flowing legato as you might find in the Schumann. Also differences in notated dynamics may play a

part in the vertical height of the finger as it approaches the keys. These examples have also demonstrated some of the major themes found in the interview results with position, movement, rigidity and flexibility all visible factors in creating different sound intentions. The next step in this study will be to connect the resulting gestures made by the pianists to the sounds produced by examining the audio and MIDI recordings, and also to explore these different touches across a number of different pianists.

V. CONCLUSION

The main implication of this study on piano touch as a whole is being able to connect the desired sound to the pianists’ movements primarily for those students learning the piano. A large number of piano teachers describe intended sounds or expressive strategies in a very vague manner, leaving it up to the student to craft his/her response to the music. However, even with those teachers who are more specific on their technical approaches, this can create issues for those who cannot readily connect their actions with the produced sound. This study has provided a perspective from the teacher’s and performer’s view, with the case study confirming the current concerns when approaching the piano.

Results show that pianists learn about touch largely through the teacher-student relationship as well as through personal experience. When learning from others, visual presentation and demonstration is important, suggesting that piano touch approaches in literature should be accompanied either by video demonstrations or detailed pictures. Considering piano touch itself, results conclude that it originates in the pianist’s musical intention, an intuitive response to the timbre of sound or specific mood they are trying to project, often manifested through the use of imagery or metaphor. The touch is also highly related to musical context, as the same touch cannot be applicable for both slow single-line melodies, and pages of consecutive octaves. Material looking at individual differences and the movement of the body as a whole system suggests that

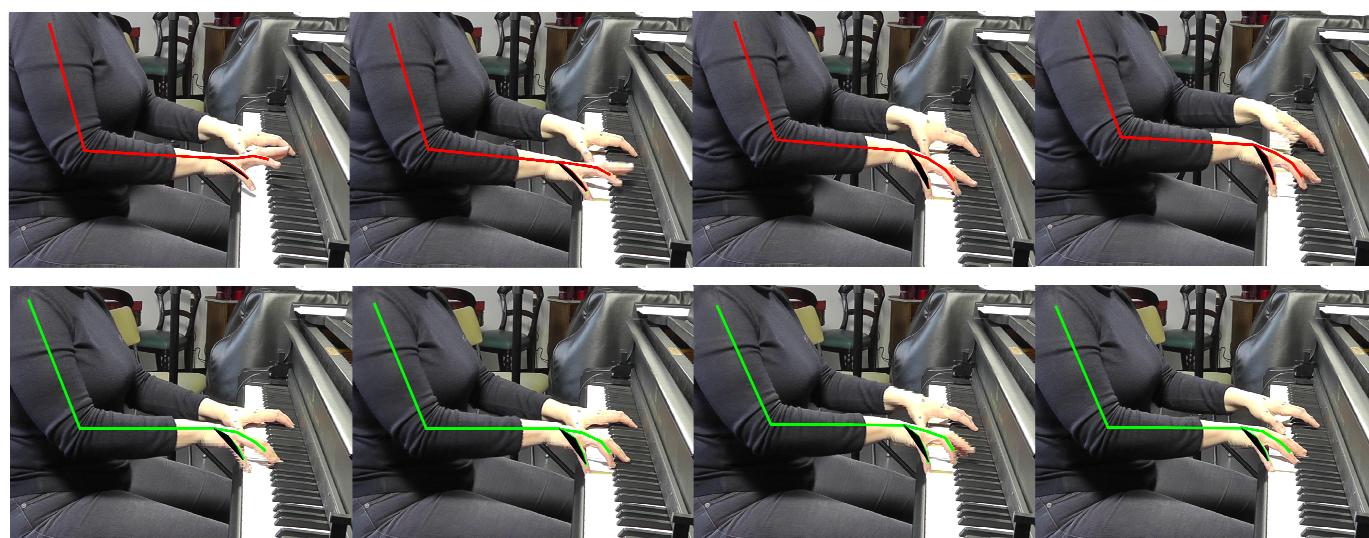


Figure 4: Top row shows frames from top F minim from the first beat of the second bar of Schumann’s *Traumerei* Op.15, No.7, performance played “*dolce cantabile*”. Bottom row shows frames taken from exact same chord in the Schumann performance played “*deciso marcato*”. The first frame in each row shows the movement approaching the key, with the second frame showing the point of contact with the key and the third frame showing the last moments of the key being depressed. The fourth frame shows the release of the key.

there is no one solution for a technical approach to touch, but that the performer's control of the different parts of their body can influence the sound produced. A large majority of teachers also give a high priority to using positions and movements that will enable the performer to achieve their aims in the most relaxed way possible. Connecting intention to physical gesture, along with parameters such as weight and point of contact on the finger, the main concern for pianists is control of tension/rigidity within the limbs, this helping to create different types of sound. When studied within two different musical contexts, the case study on touch demonstrates the changing nature of touch, all within the aforementioned parameters of firmness, flexibility and position. With the basis of touch rooted in conscious musical expression, this study provides a basis for which to explore the connection between the conscious choice of the performer and the resulting physical gesture. Implications of this study extend to piano pedagogy and the understanding of the connection between the body and instrument.

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APPENDIX

The following questions constitute the questionnaire sent to piano teachers at European conservatoires.

1. What are your own methods concerning piano touch, specifically how the finger touches the keys and the movement of the hand as a whole? Please describe in detail the physical aspects of the method and the goals it achieves.
2. What implications do these methods have – how do they affect what is played?
3. What are the origins of these methods? Are they through personal experience? Through lessons with a former teacher? Through studies of literature on the subject? Please provide references only if applicable.
4. If applicable, what were the opinions and/or methods of your own former teachers concerning piano touch?
5. Which particular pieces of literature do you think provide an accurate overview of piano touch technique?
6. Please add any extra comments you have on the subject of piano touch.