Timber and Timbre

Affordances of the Simple-System Flute

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2018

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While the simple-system flute was primarily developed as a product of 19th century Western art music, it has since become established in other genres and traditions. The aim of this licentiate thesis is to explore approaches towards the simple-system flute as it is used across genres and traditions today. These approaches are understood from the performers point of view, and focus on the relationship between the flutist and the flute. Based on interviews with six professional flute players, the study applies the theoretical concept of affordances to the interaction between musicians and musical instruments.
Timber and Timbre

Affordances of the simple-system flute

Markus Tullberg
Cover photo by Anders Wieslander

This version has undergone minor revisions with regards to spelling and formatting.

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ISSN 1404-6032
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Acknowledgements

There are many people that have, in various ways, contributed to this licentiate thesis. I would like to direct my gratitude to

… my supervisors Eva Sæther and Göran Folkestad, two brilliant minds and pedagogues. To me, their work is not only guiding my research process but it is also a display of excellent mentorship. It is an amazing skill to be able to deliver substantive critique in ways that are always inspiring and encouraging.

… my fellow PhD students in the “Aquarium” at the Music Academy of Malmö: Camilla Jonasson, Adrianna di Lorenzo Tillborg and David Johnsson. Without these colleagues, the writing of this thesis would have been a lonely enterprise.

… two great scholars who were invited to dissect and examine my work. Håkan Lundström came in at an early stage and provided inspiring input that I carried with me throughout the process and Tellef Kvifte did a fantastic job critiquing my work at the final seminar.

… Per-Henrik Holgersson for constructive critique of my presentation at the 2018 NNMPF-conference in Hurdal, Norway.

… Thomas O’Neill who helped to polish my English. I could not have wished for a person better suited to do the job; simple-system flute player, ethnomusicologist and language editor in one package!

… Stefan Östersjö for being generous with his knowledge and for taking the time to discuss my project in detail.

… Anders Ljungar-Chapelon for the fascinating flute-related research and for inspiring me to keep focusing on the music even in the most cerebral of moments.

… Anna Houmann, Sven Bjerstedt, Ylva Hofvander Trulsson and Karin Johansson for stimulating conversations, both during seminars and in the corridors of the Music Academy.

… to Åse Lugnér, chief librarian at the Music Academy of Malmö, for tracking down some of the sources that proved to be tricky to locate.

… my flute students: throughout the years, they have been essential partners in the never-ending exploration of the simple-system flute.

… my mother, Elisabeth Tullberg and my late father Johan Tullberg. I am grateful that they gave me the chance to discover music as a child and then supported my choice to follow this interest.

… my brother, Andreas Tullberg for inspiring me to pursue an academic path.
… my partner in life, Maria Bojlund, for love, support and intriguing discussions about all things related to music. Everyday, she and my two daughters, Miranda and Nora, remind me of the greater affordances of life. Without them, my whole life would have been a very lonely enterprise.

Finally, I want to direct my sincere thankfulness to the musicians who participated in the present study. They have generously shared their wisdom about flutes and flute playing, and I have done my very best to pass on this knowledge, for the benefit of all interested. I whole-heartedly recommend any one reading this thesis to locate recordings of these wonderful flute players. It will be a long playlist, and a great soundtrack to the reading you have in front of you.
Abstract

While the simple-system flute was primarily developed as a product of 19th century Western art music, it has since become established in other genres and traditions. The aim of the present study is to explore approaches towards the simple-system flute as it is used across genres and traditions today. These approaches are understood from the performer’s point of view, and focus on the relationship between the flutist and the flute. For this purpose, six professional flute players from four genres were interviewed. One of these musicians is also a maker of simple-system flutes and provided a maker’s perspective on the production of simple-system flutes today.

The theoretical framework takes its point of departure in the concept of affordances as formulated by ecological psychologist James J. Gibson. Although previously used in music research, empirical research that applies the concept of affordances to the interaction between musicians and musical instruments is still scarce. Effectivities, a theoretical construct put forward by researchers inspired by Gibson, is also an important part of the framework of the thesis.

Through an analysis of the interviews, the concept of affordances was contextually defined as relationships between the musician and the musical instrument. These relationships constitute the opportunities for actions. Four categories of affordances emerged from the results; (i) affordances of the column of air, (ii) affordances of fingering, (iii) affordances of sound, and (iv) affordances of repertoire. Additionally, one example of overlapping affordances is discussed – affordances of guidance. In this example, the combined categories of affordances provide the basis for extracting interpretative information from the instrument itself, through sensitivity towards its design. This approach, referred to as adapting to the flute is contrasted with the approach of adapting the flute. The latter of these approaches is inspired by the ultimate vision of a transparent musical instrument, where the flute becomes an extension of the body. Informing these approaches is the historical presence of the simple-system flute in the various genres, but also the subjectively perceived values that extends the strictly functional aspects of the object.

The various playing techniques described and demonstrated by the interviewed musicians are reflections of the musical genre in which they are situated as well as their own background and their aesthetic preferences. The theme of exploration is central to the interviewed musicians’ descriptions of their development as flutists. They have all been part of processes of (re)establishing or introducing the simple-system flute in their respective genre. Innate in these processes is an element of stylistic development that is bound up with the exploration of new (and old) playing techniques, here understood as creative approaches towards the affordances of the simple-system flute.
1. Introduction

During the last two decades, I have been part of the process of re-establishing the simple-system flute in Swedish traditional music. Throughout these twenty years – as a student, musician and teacher – I have always been fascinated with the simple-system flute and its central position in this musical process; simultaneously educational and artistic. The musical instrument is part of the material basis and foundation in the stylistic development of this re-establishment. From a wider perspective, the musical and stylistic influence of musical instruments is profound in all musical genres and traditions. On a detailed level every combination of musician and musical instrument is unique and thus is the experience of playing music. The personal motivation for undertaking the present study is further fuelled by a fascination for the outstanding quality that some musicians have – a capability to maximise the expression of their instruments and what they choose to play. What is really going on here? Furthermore, how can this be explored, both as a musician and in the teaching of students? Although there is a growing body of research focusing on the relationship between musician and the musical instrument, there is still much to do. This is especially true regarding the exploration of this interaction from the perspective of the performer, which ought to be a central perspective for research in music education. One promising theoretical path – and the one that will be explored in the present thesis – comes from the ecological psychologist James J. Gibson (1979/1986). His theoretical concept affordances provides an analytical tool that allows us to see beyond the dichotomy of subject/object. In the present study, I explore the theoretical understanding of the relationship between musician and the musical instrument, by applying Gibson’s ideas on this relationship. This is combined with the aim of contributing to the body of research on the simple-system flute. This is a type of flute that was developed around 200 years ago, which was a period of intense development and sometimes referred to as an era of “flute mania” (Powell, 2002, p. 144) or the “Golden Age of the Flute” (Bloom, 1985, p. 18). From a research perspective it is, however, overshadowed by its precursor, the one-keyed transverse flute, and its successor, Boehm’s cylinder flute. Today, the simple-system flute is not only a historical instrument, but is also in constant development through its manufacture by a number of highly accomplished makers, supplying simple-system flutes to a growing market of musicians within several genres and traditions. Six musicians from four of these genres are contributing as informants
to the present study. The genres that these musicians take part in include Irish traditional music, Breton traditional music, Swedish traditional music and Western art music.

1.1. Aim and research questions

The aim of the present study is to explore approaches towards the simple-system flute as it is used across European-based genres and musical traditions. These approaches are to be understood from the performers’ point of view and will focus on the relationship between the flutist and the flute. In doing this, I will apply the theoretical concept of affordances to the relationship between the musician and the musical instrument through an empirical study. In order to achieve this aim, the following research questions will be addressed:

How do flutists talk about their approaches to, and the possibilities of, the simple-system flute?

How can these approaches and possibilities be understood in terms of affordances?

1.2. Plan of the thesis

The plan of the thesis is as follows: Chapter 2 introduces the simple-system flute and aspects of its development. Also, previous research relevant to the thesis is introduced through an overview of approaches taken in musical instrument research, as well as of research specifically focusing on the simple-system flute.

Chapter 3 outlines the theoretical framework used in the thesis. It gives a summary of Gibson’s original ideas as well as a review of work applying the concept of affordances to the area of music research.

Chapter 4 explores the methodological considerations taken and the design of the study. It also introduces the participating musicians and their instruments, which are referred to throughout the following chapters.

Chapter 5 is a descriptive presentation of the results from the qualitative interviews, and answers the first research question.

In Chapter 6, I present the categories of affordances emerging from the interviews. This succeeding result chapter answers the second research question.

In Chapter 7, I discuss the results from the interviews through the lens of the theoretical framework and the relevant previous research.
Chapter 8 presents some thoughts on the pedagogical implications of the study and two paths of further research that have emerged as particularly promising through the work with the present thesis.
2. Background and previous research

The first part of this chapter explores the development of the simple-system flute. Particular focus is given to aspects of instrument design that resonate with statements presented in Chapter 5. The second part of the chapter highlights previous research of relevance to the present study. After a review of projects in this area, I present research focusing on the simple-system flute specifically.

2.1. Contextualising the simple-system flute

In Europe today, “the flute” is often synonymous with Boehm’s cylinder flute. This instrument was however invented 1847, and although it has become the standard flute in most orchestras dedicated to Western art music, other kinds of transverse flutes are still being used. The simple-system flute is both a successor to Boehm’s invention of 1847, but it is also a modern day instrument. The present study is focused on contemporary musical practice, but a brief historical background is provided in order to understand the development of the simple-system flute. In the following section, I will position the simple-system flute in a historical context. Depending on the perspective of the writer, these flutes can go under several different names such as conical pre-Boehm flutes, old system flutes, keyed flutes, the romantic flute, wooden flute or Irish flutes. A more technically accurate description of these instruments would be multiple keyed conical transverse flutes, as this would sum up the most important features; the keys, the conical bore, and of course the fact that it is a transverse flute. However, for the sake of brevity, I will use the commonly accepted term simple-system flute. There are slight variations in how different authors define the simple-system flute. In his book on the early flute, Solum (1992/2002) defines simple-system flutes as “wooden flutes or ivory flutes of four to eight keys or more” (p. viii), while Brown (2002) defines these flutes as having “between three and twelve or more separately mounted keys” (p. 20). Bloom refers to a “fully developed simple-system flute” where keys are present to secure the “chromatic ideal of one pitch/one hole” (p. 19). That would refer to a six key flute (or an eight key, if the register extends
down to C1\(^1\)). All of these definitions work for the flutes that are discussed in the present study. I do however favour Bloom’s definition since it addresses an essential characteristic of this flute model, that it was designed to avoid the necessity for cross fingerings\(^2\) in order to play a chromatic scale. To understand this confusion of names and definitions, and to get an idea of the origin of this instrument, it is necessary take a look at the technical development of the instrument and the musical contexts in which it took shape.

The development of the flute is well documented through a number of central surveys (Bate, 1969; Powell, 2002). Also, more practical guides provide insight to the technical details of the various flute models (such as Brown, 2002, and Solum, 1992/2002). Furthermore, research projects aiming to forward the musical practice of the instrument also contain relevant historical information (such as Shaw, 2013). While I do not wish to convey a simplified version of the fascinating history of flute development, it is far too complex to describe in full here, and the number of flute models that have fallen more or less in oblivion are too numerous to be included. Therefore, the following historical overview is not intended to be exhaustive and I will focus on developmental aspects of the simple-system flute relevant to the present study in order to provide a historical backdrop for the results presented in Chapter 5.

As mentioned above, the term simple-system flute is to be regarded as a technical term incorporating a hugely diverse array of keyed flutes. In his guide to the early flute, Solum (1992/2002) states that “the latter flute [the romantic flute] certainly require a separate volume, so varied are its manifestations as an instrument, so numerous are the treatises which deal with it” (p. vii). The varied manifestations mentioned by Solum are partly due to this type of flute being a development of the earlier one-keyed flutes. That is, unlike the Boehm’s cylinder flute, there is no inventor and no patent of the fundamental principle of the simple-system flute. However, variations of these flutes go beyond the number of keys, as they are the result of “widely fluctuating tastes, both chronological and geographical [from which follows a] broad range of timbral choices” (Bloom, 1985, p. 18). Bigio’s (2006/2011) book, *Readings in the History of the Flute*, contains various texts, such as essays and articles written primarily in London during the 19th century and reveals some of the complexity and diversity surrounding the development of the simple-system flute.

The flutes that preceded the simple-system flute have significance when it comes to understanding its basic design. The one-keyed conical flutes emerged around 1670 (Solum, 1992/2002). Its predecessor, the renaissance flute was

\(^1\) C1 refers to the “middle C” on a piano (sometimes referred to as C4). C1-B1 forms the first octave of the simple-system flute.

\(^2\) Throughout the thesis, *fingerling* refers to the finger combination used in order to produce a certain note.
cylindrical with six tone holes and one embouchure hole. The drastic new design of a conical bore and the Eb key allowed for a fully chromatic instrument. Covering all six tone holes and lifting one finger at a time, thus shortening the length of tube in resonance, producing the diatonic scale of D major. The tones of C, Bb, G#, F were produced by cross fingerings (also referred to as fork fingerings); the diatonic notes of D major was lowered a semitone by leaving the next finger hole open and then covering one or more holes below – while the note Eb was produced by operating the key with the right hand little finger. The cross fingered notes produces notes of a different timbre, which in turn gives each tonality a very different character. In sharp keys, the tonic and dominant notes were produced without cross fingerings, providing an open and brilliant sound. The flat keys, on the other hand had an overall more veiled character (Brown, 2002; Ljungar-Chapelon, 2008; Shaw, 2013). This inequality between the tonalities heightened the effect of harmonic modulations.

The classical flute emerged gradually from the baroque flute during the second half of the 18th century, and the distinction between them is a modern construction. The development of the design followed from stylistic changes of the character of the music, allowing for a higher tessitura. As a consequence of the prioritised second and third octave, the volume of the lower register was limited (Solum, 1992/2002). During the classical era, flute makers in England started to add more keys (Brown, 2002). The Bb, G# and F keys were first added during the 1750s (Powell, 2002). These keys enabled the flutist to produce these three notes without the use of cross fingerings, thus avoiding the timbral differences produced by cross fingerings. The addition of these keys resulted in a four-keyed flute, sometimes referred to as the standard classical flute (Solum, 1992/2002). Six-keyed flutes of this era also had keys for C#1 and C1, extending the lower range of the flute from D1 to C1 (Solum, 1992/2002, Powell, 2002). Although flutes with multiple keys became increasingly popular, one-keyed flutes remained in production during the first half of the 19th century (Solum, 1992/2002). Two more keys were also added; the long F key and the key for C2. The F natural was already possible to produce through the use of the short F key. The short F key is however operated by the ring finger of the right hand, which is also used to play the note D. The long F key is operated by the little finger of the left hand, thus enabling a smoother transition between D and F in the first two octaves (Solum, 1992/2002). The key for C2 was added out of the same reason as the Bb, G# and the short F key – to avoid the need for cross fingerings in order to enable a more equal sound over all tones. It is important to note that, initially, these keys provided only an alternative way of producing already existing notes. The cross fingered notes remained as a possibility, or even more viable alternative (Bloom, 1985; Brown, 2002).

Although the keys provided a possibility for a more homogenous sound by avoiding cross fingerings, another cause for inequality remained: the open finger
holes. Placing a hole further up the bore raises the pitch and vice versa. This can be compensated by making the size of the hole smaller or wider. Since the holes are covered by the fingers, they must be placed within comfortable reach. From this follows that the hole sizes must be altered according to where they are positioned. The result is a series of finger holes that are uneven in size and hence the responding notes have uneven qualities.\(^3\)

Eventually however, the process of integrating the keys as an inherent feature of the instrument design by altering the size and position of finger holes, made the cross fingered alternatives less useful and relevant (Brown, 2002). This gravitation towards large holes can be understood as a “trade-off between the ease of execution of the small hole flute with eight keys, and the enormity of (and beyond that, the ‘reedy’ quality of) the sound produced by the large hole flute” (Bloom, 1985, p. 20). The profound impact that the hole sizes have on the playing characteristics contributed to manufacturers advertising flutes with both large and small holes (Waters, 2011). During the last decades of the 18th century, there were two different approaches towards the sound of the flute. An old style, featuring soft and delicate sound was contrasted with an emerging powerful sound. The differences between these two approaches became especially obvious in the low register of the flute (Powell, 2002). Related to this, was the existence of the travelling virtuosos\(^4\), which made both musicians and audiences aware of the variety of playing styles associated with different regions and nations (Powell, 2002). The gravitation towards an increased sound volume was due to changing performance contexts with larger audiences and more virtuosic and dynamic playing styles. Other instruments, such as the violin, were also adapted to produce a larger sound, thus encouraging flute players to both adapt their playing technique and demand more dynamic possibilities of their flutes (Powell, 2002).

The flute making firm Rudall & Rose was formed in London 1822, and held a unique position, both when it came to their dominant position on the flute market in Britain, as well as the impact of their flutes on current makers of simple-system flutes\(^5\). Rudall & Rose’s main competitors regarding high quality eight-keyed simple-system flutes in London were Monzani, Clementi & Co. and Thomas Prowse. The latter two makers produced models of the simple-system flute in collaboration with the virtuoso Charles Nicholson (1795-1837). These flutes featured a large embouchure hole and large finger holes. Other features of these flutes were the flattened area around the finger holes of the lower middle section

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\(^3\) See Greene (2012) for a discussion on ways to address the weak E1.

\(^4\) Rice (1990) provides an insight to the fascinating life of one such traveling flute player, Friedrich Ludwig Dülon (1769-1826).

\(^5\) The firm was later renamed Rudall, Rose & Carte, as Richard Carte became one of the owners of the firm. It was because of Carte’s progressive ideas that the firm took up the production of Boehm’s flutes (Bigio, 2011).
of the flute. This design supported aspects of the playing style associated with Nicholson: the powerful sound and the glides\(^6\) between notes (Bigio, 2011; Shaw 2013). Except for these technical features of the instrument, Nicholson described his powerful sound as a consequence of an embouchure consisting of pressure and tension (Powell, 2002). Nicholson’s tone became a new reference point in the comparison between the competing flutists of the day (Powell, 2002). The Nicholson improved flute further popularised instruments with larger holes (Bate, 1969; Solum, 1992/2002; Shaw, 2013). Robert Sidney Pratten (1824-1868) was another English flute player who introduced “improved” flutes to the market (Bigio, 2011; Powell, 2002). The first of those models had a cylindrical bore and keys to aid the player in covering the large holes. To musicians within Irish traditional music today however, “Pratten” usually refers to conical flutes with the standard six or eight keys, featuring a wide bore and large finger holes, which are based on flutes made by Boosey & Co. in collaboration with Robert Sidney Pratten (Bigio, 2011). Waters (2011) points out that in London, “the symbiotic relationship between maker/distributor and player becomes characteristic of nineteen-century production”. Waters exemplify:


At the Paris conservatory, a prominent institution for flute playing in Western art music, the one-keyed flute was replaced by simple-system flutes with four to ten keys in 1803, when Devienne retired as the flute teacher. This kind of flute dominated until 1860 and the introduction of Boehm’s cylinder flute at the conservatory. This happened as Tulou left the position as professor of flute to Dorus in 1860, who introduced the Boehm flute at the conservatory (Ljungar-Chapelon, 2008). Tulou was in opposition to new flute designs (i.e. Boehm’s ring flute\(^7\)) and argued that the flute should be able to produce “a mellow voice when playing piano, a vibrant and sonorous tone when playing forte” (Tulou cited in Powell, 2002, p. 158), timbral dimensions that he considered to be lost in the new inventions.

While English makers started to make flutes with larger holes the smaller holes remained to be the norm in France (Bate, 1969; Bloom, 1985; Solum, 1992/2002).

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\(^6\) Glides refer to the sliding from one pitch to another though slowly covering or uncovering a finger hole (Shaw, 2013).

\(^7\) Boehm’s ring flute was invented in 1832. It had a conical bore and featured a system of keys similar to the system used on the later cylinder flute (Ljungar-Chapelon, 2008).
In order to keep the possibility to produce F1 an F2 through cross fingering, the finger holes needed to remain relatively small. Because of this, some flute players argued that the F# was too flat. In order to keep the small holes, while at the same time facilitating a sharper F#, flute maker Tulou invented the F# key. In his *Méthode de flute* he writes:

> I have added a little key whose function is to sharpen the F sharp and give it all the needed accuracy in pitch, especially when the phrase has to be played piano. It’s fingering is easy; it’s only a question of placing the little finger on that key instead of on the e-flat key. (Tulou, 1835/1995, p. 32, translated by Dockendorff Boland & Cannon)

The divide in taste between French and British flute players, audience and critics is evident in the story of Louis Drouet (1792-1873), a flutist, educated at the Paris Conservatory, who attempted to set up a flute factory in London. Although his flutes were of high quality, they adhered to the French ideal, and the business in London was not successful: “the French ideal being no more appreciated by the British public than was Nicholson’s in France” (Bate, 1969, p. 153).

In Germany, there was a general opinion surrounding the Boehm flute as being ”excessively brilliant and monotonous” (Powell, 2002, p. 159), and many orchestras remained conservative regarding flute models. Interestingly, the perceived drawbacks of Boehm’s cylinder flute included its loud tone that, according to German flute players at the time, resembled the sound of a trumpet (Powell, 2002). The demand for mechanical improvements were instead channelled towards the conical flute. The *reform-flute*, originally designed by Schwendler in 1885 has extra trill keys and an intricate system of axels in order to improve the functionality of the many keys (Bate, 1969).

The sound produced by Nicholson and his flutes also influenced Theobald Boehm in his revolutionary flute designs of 1832 and 1847. As mentioned above, the latter of those models, the cylinder flute, is the main flute used in Western art music today. While, its construction has undergone changes throughout the years, the overall design remains the same. This flute was first popular in France and, as mentioned above, became the chosen instrument at the Paris conservatory. Although it slowly gained in popularity, some flute players of the late 19th century rejected the Boehm flute (Solum, 1992/2002). Both the simple-system flute and Boehm’s cylinder flute (as well as other competing finger systems) remained in parallel use well into the 20th century (Powell, 2002; Bate, 1969).

The production of new one-keyed flutes, based on flutes from the baroque era (although pioneered by Arnold Dolmetsch in late 19th century), is linked to the Early Music Revival and the maker Friedrich von Heune (1929-2016) in particular (Solum, 1992/2002). Contemporary production of simple-system flutes begun in the 1970s, as the result of the folk music wave and the success of bands such as
the Chieftains (Powell, 2002). Current makers, such as Grinter, Hamilton, Wilkes, and Olwell are mainly targeting the market of Irish traditional musicians, but to an increasing number of players of Breton traditional music. In order to meet the demand for flutes of lower cost, there is a production of flutes in Pakistan, as well as flutes made in various plastic materials.

2.1.1. The simple-system flute in detail

Simple-system flutes are predominantly made of wood: most common is African blackwood (Grenadilla), cocuswood and boxwood. There are also historical examples of simple-system flutes made of ivory or glass (Bigio, 2011). The flute is constructed in three to four separate joinable sections which are commonly referred to as joints (foot joint, head joint etc.). I will refer to the parts of the flute in line with Solum’s (1992/2002) terminology: head piece, middle piece and foot piece, and where the middle piece is divided in two, as upper middle piece and lower middle piece. The section in between the head piece and the middle piece(s) containing the tuning slide, is referred to as the barrel. The flute is assembled through joints which are usually fitted with thread or cork.

The simple-system flute comprises of a number of keys. As is obvious from the historical overview above, the number of keys may vary. However, the most common setup is six (Eb, short F, long F, G#, Bb and C2) or eight (C1, C#1, Eb, short F, long F, G#, Bb and C2). Beyond this there may exist double touches for some keys, the most common being Bb. Sometimes the two F keys are setup as two touches, opening the same key, thus avoiding an extra hole in the body of the flute. The keys are either block-mounted or pin-mounted, that is, they are either supported by wooden blocks extending from the body of the flute, or by metal protrusions as typically found on clarinets.

The simple-system flute is a non-transposing instrument (i.e. a C-instrument) that is often labelled with reference to the note produced when all six finger holes are covered, that is, the lowest possible note without the use of keys. A concert pitch simple-system flute is therefore often referred to as D flute. On a few occasions in the present thesis, the interviewed musicians talk about flutes in other keys and are using this concept in their labelling. Therefore, a G flute is tuned a fourth above the concert pitch flute and the Eb flute is pitched a semi-tone above.

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8 A touch refers to the part of the key that is being pushed by the fingers in order to open or close the key.
2.1.2. Fingering system and notes

In the present thesis, fingerings are described through a system of numbers and letters, designating specific fingering configurations. Some fingers may only cover holes or operate keys, while others may do both. On a standard eight-keyed simple-system flute, the possibilities for each finger are the following⁹ (Figure 1):

<table>
<thead>
<tr>
<th>Left hand</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>thumb operating (opening) the Bb key</td>
</tr>
<tr>
<td>2</td>
<td>index finger covering the first finger hole</td>
</tr>
<tr>
<td>3</td>
<td>middle finger covering the second finger hole</td>
</tr>
<tr>
<td>4</td>
<td>ring finger covering the third finger hole</td>
</tr>
<tr>
<td>5a</td>
<td>little finger operating (opening) the G#/Ab key</td>
</tr>
<tr>
<td>5b</td>
<td>little finger operating (opening) the long F key</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Right hand</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>the thumb is used to hold the flute</td>
</tr>
<tr>
<td>2</td>
<td>index finger covering the fourth finger hole</td>
</tr>
<tr>
<td>2a</td>
<td>index finger operating (opening) the C2 key</td>
</tr>
<tr>
<td>3</td>
<td>middle finger covering the fifth finger hole</td>
</tr>
<tr>
<td>4</td>
<td>ring finger covering the sixth finger hole</td>
</tr>
<tr>
<td>4a</td>
<td>ring finger operating (opening) the short F key</td>
</tr>
<tr>
<td>5a</td>
<td>little finger operating (opening) the Eb/D# key</td>
</tr>
<tr>
<td>5b</td>
<td>little finger operating (closing) the C#1 key</td>
</tr>
<tr>
<td>5c</td>
<td>little finger operating (closing) the C1 key</td>
</tr>
</tbody>
</table>

**Figure 1**
Fingering possibilities on a standard eight-keyed simple-system flute

In the present study, the interviewed musicians refer to flutes that allows for actions beyond the ones listed above. These are (Figure 2):

<table>
<thead>
<tr>
<th>Left hand</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1b</td>
<td>thumb operating (opening) an additional G#/Ab key</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Right hand</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>2b</td>
<td>index finger operating (opening) an additional Bb key</td>
</tr>
<tr>
<td>5d</td>
<td>little finger operating (closing) a low B key</td>
</tr>
<tr>
<td>5e</td>
<td>little finger operating (opening) an F# key</td>
</tr>
</tbody>
</table>

**Figure 2**
Additional fingering possibilities mentioned in the present study

Numbers inside brackets indicate that the finger hole is partially covered (“half-holed”). For example, producing F natural using this technique would be written: [234/2(3)]. Notes without indications of octave (i.e. F# and not F#2) refer to the range of D1 to B2. In this register, the fingering is, with a few exceptions, identical for both octaves. Below and above this register, the fingering is different and thus requires a specification of the octave.

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⁹ Some flutes are setup in a reverse manner, on request from left-handed musicians. All interviewed musicians in the present study use regular flutes and left hand is synonym with upper hand, and – accordingly – right hand is synonym with lower hand throughout the text.
2.2. The musical instrument in research

In the following section, I will highlight some areas of the diverse research corpus that has musical instruments as their focus. Being one of few tangible aspects of music, musical instruments have long been an area for research. Ethnomusicologist Aho (2016) highlights two fundamentally different approaches taken in music instrument research: (i) one treats musical instruments as *sounding objects*, and the other (ii) views musical instruments as *transducers of movement*, from physical to musical. I would suggest a third category, that is research that explores musical instrument as cultural artefacts and focuses on the social, aesthetic and cultural meanings bound up with, and associated with these objects. The three different approaches taken in research on musical instrument presented here all have their role to play in the endeavour to understand an instrument. Research belonging to all of the three areas is referenced in the discussion in Chapter 7.

2.2.1. Musical instruments as sounding objects

This approach is perhaps best illustrated by Hornbostel and Sachs’ (1914/1961) referential classification system. This branch of research, referred to as organology, primarily concerns itself with technical aspects of sound production. From this perspective, Hornbostel and Sachs divided instruments into categories: (i) *idiophones* (the resonance of the musical instrument itself is the source of the sound, such as xylophones or castanets), (ii) *membranophones* (a vibrating membrane is the source of the sound, such as a drum), (iii) *chordophones* (stringed instruments), and (iv) *aerophones* (wind instruments). The classification system includes sub-categories, which make it possible to classify instruments with great detail and precision. To exemplify how the classification system works, we can follow the simple-system flute through the system of categories and sub-categories: 4: *aerophones*, 42: *wind instruments proper*, 421: *edge instruments or flutes*, 421.1: *flutes without duct*, 421.12: *side-blown flutes*, 421.121: *single side-blown flutes*, 421.121.1: *open side-blown flutes*, 421.121.12: *with finger holes*.

Related to a classification system building on the sound production such as Hornbostel and Sachs’ and within the research paradigm looking at musical instruments as sounding objects, is the scientific acoustical research on musical instruments. Although the design and construction of musical instruments through much of the history has been an empirical process, acoustical research seeks to understand the workings of musical instruments through a theoretical approach. Besides providing information for instrument design, research can scientifically explain experienced phenomena. One example of such research explores the effect of timpani playing in close proximity to French horn players (Chen, Smith &
It has been noted by horn players that the timpani, if placed close to each other in an orchestra, interfere with their playing. This is especially significant if the bell of the horn is facing the timpani. The explanation for this is that the horn’s transfer function works in both directions. The sound of the timpani is transferred in the direction from the bell to the mouth and can be experienced “like being hit in the mouth” (Buckle, 2008, cited in Chen, Smith & Wolfe, 2013, p. 472).

However, the present study is focusing on the subjective perspective of the performers without the aim of providing scientific explanations of their experiences. Still, it is of interest to note that acoustical research on wind instruments to some degree is investigating related topics. Particular acoustic aspects of the air column have been studied, such as whether the air column is bent or straight (Nederveen, 1998, Felix & Dalmont, 2012), the effect of holes perforating the bore (Benade, 1960, Keefe, 1982), and the material of the walls (Backus, 1964, Coltman, 1971). Acoustical research combining the air column of wind instruments with the body of the musician has been conducted in order to measure the impact of the vocal tract on the sound produced. Researchers have been exploring clarinets (Benade, 1986; Backus, 1985), and saxophones (Scavone, Lefebvre & da Silva, 2008). Research on the simple-system flute, including acoustical research is presented section 2.3.

### 2.2.2. Musical instruments as transducers of movements

Aho’s (2016) notion of the musical instrument as transducer of movements refers back to Bielawski’s (1979) definition of a musical instrument as ”a transformer, transforming bodily gestures in physical time and space into musical gestures in musical time and space” (Kvifte, 2008a, p. 46). This approach to musical instruments includes mapping structures\(^\text{10}\) and research on musical gestures. As noted by ethnomusicologist Baily in 1985, music research in the West has traditionally been grounded in assumptions about the nature of music, regarding music as “primarily a sonic phenomenon; study of the motor control of musical performance may be interesting but is ultimately irrelevant to the central issue, which is the perception of musical sounds” (Baily, 1985, p. 238).

New ways of studying musical instruments, beyond Hornbostel and Sachs’ classification system mentioned above, have been fuelled by the digital development, which repositions research questions related to the study of musical instruments. An instrument does not necessarily have a physical source of sound production, through which it is possible to make a useful definition. Kvifte

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\(^{10}\) The term mapping commonly refers to the correspondence between control parameters and sound output of a musical instrument.
(2008a) takes this moving ground as a point of departure for a discussion on how to define a musical instrument. As he shows, there cannot be one single way to define what a musical instrument is, while still doing justice to its complex nature. Kvifte highlights a question of certain interest for the present study, namely how to define the divide between the musician’s body and the musical instrument. The flute is clearly depending on the musician’s body not only to provide a stream of air, but the cavity of the mouth, and the shape of the lips may also change the more subtle identity of the sound of the flute. In order to visualise the interaction between musician and musical instrument, Kvifte provides the following loop model (Figure 3):

![Loop Model](image)

**Figure 3**
Kvifte’s loop model (Kvifte, 2008a, p. 53).

As will be highlighted in the presentation of the theoretical framework in Chapter 3, Kvifte’s model implies an understanding of the interaction between musician and musical instrument that can be further developed through the concept of affordances.

11 See for example Ljungar-Chapelon’s experiments of this parameter of sound production on the Boehm flute (Ljungar-Chapelon, 1990).
The interaction between musician and musical instrument can also be described through mapping systems. These systems are based on input (control actions) and output (sound). This is a perspective that has proven to be fruitful, especially in research on digital and electronic instruments (Goto & Suzuki, 2004; Hunt, Wanderley & Paradis, 2003). In his article on complex mapping structures, Kvifte (2008b) makes a relevant remark: “what is aimed at here, however, is not a description from a performer’s point of view. Rather, the aim is to contribute to an analytical framework that may be used to describe general properties of instrument control” (p. 355). The interaction between musician and musical instrument is also a relevant focus within the emerging field of artistic research. Whereas research in mapping structures has much to offer musicological studies, research from the performers point of view may require other theoretical perspectives. In line with Bielawski’s definition of a musical instrument, the study of musical gestures is a growing field of research (Gritten & King, 2006; Gritten & King, 2016).

Furthermore, there are examples of first-person perspective research on interaction between musician and musical instrument inspired by phenomenology. Such examples include Edlund’s (2003) study of the relevance of the physical act of fingering for the performing pianist. An example of how this theme can be studied in performance-based ethnomusicology is found in Aho’s (2016) book, The Tangible in Music, where he takes his own practice of learning to play the Kantele as a point of departure to explore, as he finds it, the three tangible aspects in music: the instrument, style and expression. Resonating with the present study is the fundamental idea that: “the musical instrument is […] invented twice, once by its maker, and then again by the person who plays it” (p. 16). That is, the musical instrument in itself is incomplete and presupposes the musician who handles it. This is more drastically put forth in the writings of Dogantan-Dack (2015): “Phenomenologically, the piano does not exist as a musical instrument prior to its emergence in the kinaesthetic-affective consciousness of the pianist, who constructs its instrumental identity through embodied interactions with it” (p.178). The piano is in the centre for her research project in which she explores the tactile aspects of music making. She is effectively highlighting the physical interaction with the musical instrument as a locus point in the performance.

Baily’s (1985) research, building upon his experience from the stringed instruments dutār and rubāb, was well ahead of its time, highlighting the relationship between the spatial layout of a musical instrument and the shape of the music associated with it.

Still, the embodied experience of playing musical instruments is in need of further research, also within the area of music education research. Gagné and McPherson (2016) highlight a lack of research that ought to be focusing on the psychomotor abilities. As mentioned in the introduction, the theoretical concept of affordances provides one such method, which will be presented more closely in Chapter 3.
2.2.3. Musical instruments as cultural artefacts

Viewing musical instruments as cultural artefacts is an aspect of research beyond the scope of musical gestures, as well as Hornbostel and Sach’s organology and acoustical research as presented above. As such it was a way to expand the relevance of research on musical instruments from something that mostly happened within the domains of museums and laboratories respectively. That the understanding of a musical instrument is culturally situated becomes ever so clear when Kvifte (2008a) addresses the, sometimes confused, relationship between name and artefact. One example of this is the instrument names fiddle/violin. While the physical appearance of these instruments are the same, their identities are different. He contrasts this with the Hungarian Taragot, which although being transformed from a double reed instrument into a larger single reed instrument, remained to be identified as the same instrument. This connection between a musical instrument and its cultural context has proven to be a fruitful point of departure for ethnomusicological studies with an interest in the social and cultural connotations of musical instruments. One of the reasons for this is, that for an ethnomusicologist, playing an instrument is a way to gain acceptance to social contexts that otherwise would be hard to access (Bates, 2012). Ethnomusicologist Dawe (2001) points out that there are many layers of meaning to an instrument which are not necessarily connected to its technical manifestation: “as much as they are locked in museum display cases and held in local traditions; they are increasingly polyvalent and polysemic without necessarily being polymorphic and polyphonic” (p. 222). In an article on the Mijwiz, an eastern Mediterranean wind instrument, Racy (1994) argues for a perspective on musical instruments as “interactive entities” (p.38). According to Racy, musical instruments are situated in dialectical relationships with their surroundings. Taken together, aspects such as the construction, instrument-specific playing techniques, and symbolic connotations, create an understanding of the musical instrument as “one specific acoustical aesthetic complex” (Racy, 1994, p.51). Related research includes Qureshi’s (1997) exploration of the Indian Sarangi and the “web of meanings emanating from the sound” (p. 1). Being an ethnomusicologist and performer of the Sarangi, Qureshi explores the strong relationship between sound, aesthetics and the political connotations surrounding the instrument. Through a review of the revival of the bagpipe in Sweden, Ronström (1989) is able to place this particular instrument in the centre of the contemporary political and social climate of Sweden: “In the process of reviving the bagpipe in Sweden parts of a historical and cultural heritage have been transformed and used in contemporary society for many different purposes” (p. 105). In this way he highlights the meanings of the instrument as it stretches beyond the physical object itself. Considering the social aspects of musical instruments, Bates (2012) makes a distinction between the musical instrument as being the subject or the object of the research. He explains:
"there is a difference between musical instruments being incidental to, or constitutive of, social interaction" (p. 373). Bates exemplifies this mode of "thinking through instrument" (p. 368) through his own research on Turkish Saz (Bates, 2012).

Wettermark (2016) highlights the distinction between the instrument and the sound of the instrument in his research on the Vietnamese shawn, Kèn. Wettermark shows that the sound, carrying strong associations of funerals and sorrow, overshadows both the physical instrument and the musician. The physical object is rather anonymous, in that it lacks the ornamentation otherwise present on Vietnamese musical instruments. Rather “it’s meanings […] lie not in the physicality of a handcrafted wooden object, but in their impact on the sensory environment of their audience” (p. 3). The sound is the key to understand the instrument and its position in the Vietnamese society.

2.3. The simple-system flute in previous research

Although there is a rather extensive corpus of research focusing on one-keyed transverse flutes, research on the simple-system flute is limited. In this section I will highlight some examples of such existing research that is of interest to the present study.

Ljungar-Chapelon’s (2008) dissertation focuses of the French tradition of flute playing within Western art music. The thesis consists of two parts, the first of which is a historical survey covering the period from the 18th century to the present day. This timespan covers the period when the simple-system flute was most frequently used, and the survey includes historical information of value for further research on this type of flute. However, as Ljungar-Chapelon points out, the most interesting periods regarding flute playing in France are 1690-1730 and 1860-1930, thus highlighting parts of the history where one-keyed flutes and Boehm’s cylinder flutes were primarily used. The second part of Ljungar-Chapelon (2008) is an interview study with flutists Peter Lloyd and Alain Marion. The focus of the thesis is aesthetics, playing technique and teaching methods. Among the results presented, Ljungar-Chapelon shows that one of the central aspects of this pedagogical tradition is the endeavour to make the student become his or her own teacher, and thus enabling a successive development as a musician. Ljungar-Chapelon refers to this as the automeiectic process.

Interestingly, the simple-system flute as used in Irish traditional music occurs in a number of computer based research projects. One of those projects focuses on the development of the computer software MATT (Machine learning for Articulating Traditional Tunes), which was designed to simulate the creative process of interpretation of Irish traditional tunes. Based on analysis of the playing
of two Irish traditional flute players, Catherine McEvoy and Eamon Cotter, MATT generated versions of traditional tunes, incorporating interpretational practices such as ornamentation and melodic variations (Duggan, Cui, & Cunningham, 2006).

Ali-MacLachlan, Köküer, Athwal, and Jancovic (2015) devises a process of digital spectral analysis in order to explore differences in timbre between commercial recordings with Irish Traditional flute players. Continuing the analytic research, Ali-MacLachlan, Tomczak, Southall, and Hockman (2016) are focusing on other aspects of flute playing. This project develops a computer-based method of analysing playing style through ornamental practices. The ornaments cuts and strikes generate deviations of pitch, which can be detected in the analysis.

Bania (2008) offers a thorough review of original sources regarding the use of vibrato and articulation. Since her period of interest includes the 19th century, the thesis covers practices described by, and associated with, flute players using the simple-system flute. Being a flutist specialised in historically informed practice, Bania also experiments with the techniques described. Thus, her interpretation of her sources is directly informed by her experience as a practitioner. Furthermore, Bania combines the written text with a music recording, demonstrating the application of the techniques investigated.

Shaw’s (2013) PhD-project also consists of two parts: the first is a written text that examines Charles Nicholson’s practice, focusing on three areas associated with his playing: tone-colour, vibration and the glide. The research is informed by Shaw’s use of an original Nicholson’s improved flute, which also is used in the recorded recital forming the second part of the thesis. Shaw’s work effectively highlights the interplay between instrument design and aesthetic visions (the aspects of flute playing that Nicholson is famous for are facilitated by the altered design featured on the Nicholson improved flute).

Balasso-Bardin, de la Cuadra, Vauthrin, and Fabre’s (2017) article on Boehm’s 1832 flute model is not strictly research on the simple-system flute, as this flute combined the conical bore of the simple-system flute with Boehm’s new key system. However Boehm’s intension to improve the flute must be understood against the backdrop of fast development, both musical and technical, that the simple-system flute was part of. This transition flute, as the authors of the article refer to it, was never patented and standardised (as Boehm’s later cylinder flute). Several different makers and firms manufactured it and the various manifestations are many. Balasso-Bardin et al. measures the geometrical and acoustic properties of four transition flutes and compares the results with measurements from a modern Boehm flute. These measurements are then the starting point for the making of a new transition flute. The process is guided by the interpretation of Boehm’s own writings regarding the intention of his invention. Among the interesting results from the study are the measurements regarding intonation. The passive resonance of each note (i.e. the pitch of an artificially produced tone) was
measured. These results were then used in order to calculate how much the musician needed to adjust the intonation (by changing the angle of the stream of air, the speed of air and the opening of the lips). On all flutes, the musician has to control and adjust the blowing technique according to the passive resonance and the desired pitch. The extent and predictability, of these adjustments varied between the different flutes. In this regard, the modern Boehm flute was significantly more predictable than the transition flutes.

Lochridge’s (2004) master’s thesis provides an interesting insight into the material culture of the Irish traditional flute playing tradition. As she explains: “this thesis is about the search – individual and large-scale collective search – for good instruments which members of the flute community engaged in for generations” (p. 13). Focus is given to the relationship between flute maker Patrick Olwell and the musicians playing his instruments. A circular relationship is manifest in the interviews where “the performance of the maker is very much tied up with the performance of the musician, and vice versa” (p. 103). To Olwell, the sound produced by the musicians he admires is a source for inspiration, leading to improvements in his design, in turn facilitating yet new possibilities for the musicians playing his instruments. She notes that, for flute makers such as Olwell, the existing flutes of the 19th century provided the guidance in their apprenticeship that otherwise would be provided by a master craftsman. The musicians and makers featured in Lochridge’s study confirm that the making of simple-system flutes has improved since it reappeared in the 1970s. As one of the pioneering flute makers, Terry McGee has stated that “in seventy-four if you made a flute at all you were a hero, but nowadays if you make a flute it has to be very good otherwise it’s a heap of trash” (cited in Lochridge, 2004, p. 113). Of the studies mentioned in this section, Lochridge’s is probably the thematically and methodologically closest to the present study.
3. Theoretical framework

In this chapter, I will present the theoretical framework of the present study. The aim to explore the relationship between the musician and the musical instrument from the perspective of the performer calls for a theoretical approach that elevates the musical instrument from being, in this case a inanimate piece of wood, to an object that is involved in a multifaceted and reciprocal relationship with a musician. Gibson’s theory of affordances presents one way of pursuing such a study. 3.1 outlines the original theory of affordances, while 3.2 presents relevant approaches taken by researches applying the theory on music studies. Affordances and learning is briefly touched upon in 3.3. The debated concept of effectivities is discussed in 3.4. This concept is of significant relevance to the present study, and since it has been understood and applied in different ways, some of these interpretations are reviewed.

The purpose of the chapter is not to argue for a final definition of affordances and its related constructs in relation to music. It is rather to portray a, perhaps surprisingly, diverse theoretical landscape. I will then return to the theoretical framework in the discussion, to see what theoretical insights might be drawn from the empirical material of the present study.

3.1. Affordances

The concept of affordances is a central aspect in the ecological approach to perception, originally formulated by Gibson (1979/1986). Gibson’s scholarly undertaking might be understood as a reaction against a predominant view of perception as “a three-term relation among a subject, an object, and something internal to the subject that stands in for the object (e.g., a representation)” (Dotov, Nie & de Wit, 2012, p. 29). One example of such a third part is the image projected on the retina. This optical information needs to be matched against previous acquired knowledge of the subject, which presupposes an internal process of making sense of this information (Dotov, Nie & de Wit, 2012). At the basis of such understanding of perception lies a two-fold assumption: “(1) the input does not provide a sufficient basis for an organism’s knowing its environment, and (2) the embellishment that is needed for perception is supplied
by the organism, usually in the form of memories” (Michaels & Carello, 1981, p. 8). One way to understand the difference between the theory of perception as postulated by Gibson and the theories that he reacted against, is what kind of questions are addressed:

Gibson is really asking the *what* question while the other theorists are asking the *how* one. Where Gibson emphasizes the study of information as determined by the organism-environment interaction, the other theorists emphasize the study of the information-processing capabilities of organisms after they are presented with any information – whether of ecological value or not. (Shaw & McIntyre, 1974, p. 309-310)

Instead of the three-term relation, Gibson argued for an understanding of perception as a *direct relationship* between subject and the surrounding environment. It is within this theoretical paradigm that he introduces the concept of *affordances* (1979/1986). As the following section shows, the idea of affordances is resilient enough to be adapted into different settings while it keeps its power to explain, otherwise potentially obscure, relationships.

Affordances can be described as a set of relations between an organism (referred to as subject henceforth) and the environment, including the available objects therein. An object affords a possible action to the subject according to the context, experiences, the situation and needs of the subject in that situation; a guitar may afford strumming a few chords for a beginner, while it may afford the performance of a Villa-Lobos piece for a classically trained guitarist. These affordances are not properties of the object alone but exist in the relationship between the object and the subject. The subject’s perception is not passive; on the contrary, perception is oriented towards action and the exploration of the surrounding environment. As Gibson (1979/1986) showed, when a subject moves around in the environment, the changing position is perceived through an optical flow. This optical flow continuously informs the subject of the subject’s position, guiding the subject forward in the movement. Action and perception is happening simultaneously: “It cannot be said that the optics change first and the act is in response to that. During an activity, the actor and the optic array are continually changing” (Michaels & Carello, 1981, p. 49-50).

In an example involving musical practice, senses other than the visual needs to be taken into consideration. Take the classically trained guitarist mentioned in the example above. Imagine the following scenario: the guitarist enters a music room in a primary school with the intention of picking up her eight-year old son, but decides instead, to the excitement of the children and the teacher, to give an impromptu performance of a Villa-Lobos piece. There are guitars hanging on the walls and being an experienced guitar player, she recognises most of the brands. She quickly scans the instrument collection and settles for one that looks promising; all strings are there, the neck is straight, and the tuning pegs seems to
be in order. She takes the guitar and sits down on a chair. She strums a G chord and instantly notices which strings needs to be tuned. She adjusts the tuning and begins the piece. After a few bars she notices a faint buzzing sound accompanying a certain note. From the sensation in her fingers, she understands that this must be due to the string being too close to the nearby frets. She looks around and finds a piece of paper, which she folds and puts in between the string and the saddle, in order to lift the string just enough to solve the problem with the buzzing sound. She needs to quickly retune the string in question before she starts the piece again. While playing she notices that this particular guitar has a very different response than the usual guitar that she normally uses in concert. The acoustic properties are rather uneven across the register and she intuitively adjusts her playing technique in order to compensate for the lack of response in the middle register. This scenario exemplifies the inseparable acts of action and perception, and how these are defined by the individual. If the scenario was portraying a pianist, he might instead complain about the out of tune grand piano that the guitarist did not even notice.

The inherent perceptual directness of affordances means, according to Michaels and Carello (1981), that “humans do not perceive chairs, pencils, and doughnuts, they perceive places to sit, object with which to write, and things to eat (p. 42). They continue by stating that “to detect affordances is, quite simply, to detect meaning” (p. 42). In the example above, the guitar player’s action is constantly guided by her perception which is in turn dependent on her actions. Thus, the two are entwined. This intimate relationship between perception and action, underpinning the concept of affordances, has been referred to in slightly different ways: ”perception-action interrelationship” (Michaels & Carello, 1981, p 48); ”perceiving-acting cycle” (Shaw, 2001, p. 296); “action/perception loop” (Östersjö, 2010, p. 78), and “perception-action coupling” (Warren, 1990, p. 33). Windsor (2016) combines the study of musical gestures, as mentioned in Chapter 2, with ecological psychology and adds the notion of traces to visualise the information that specifies the gesture/action (Figure 4).

Figure 4
Diagram representing the flow of perception and action for a single musician (Windsor, 2016, p. 61).
3.2. Affordances and music

The concept of affordances has been used previously in music and music education research. In this section, I will summarise research projects that either have a direct bearing upon the present study, or in other ways have contributed to the understanding of affordances in musical contexts. I end this section with some thoughts on the different approaches taken in these research projects.

Folkestad (1996) introduced the theory of affordances in a musical context through his study on computer-based creative music making. Depending on the background, the participants of the study showed significantly different approaches towards the computer as a compositional tool. Participants with experience of playing an instrument proved to be less interested in exploring the affordances of the computer, while participants without experience of musical instruments were more likely to fully utilise the possibilities of the computer as a compositional tool. In Folkestad (2004), the affordances of composition are summarized as follows: “The creative music making takes place in a process of interaction between the participants’ musical experience and competence, their cultural practice, the tools, the instruments, and the instructions—all together forming the affordances in the creative situation” (pp. 87-88, cited in Folkestad, 2012). Folkestad draws an interesting parallel between the ability to perceive and make use of affordances and the, otherwise evasive term ‘creativity’:

This implies a definition of creativity, or rather to act creatively, as the ability to perceive new affordances, or old affordances anew, and to elaborate these affordances in each situation. Thus, the meaning of creativity involves a relation to the surrounding in which the human being continuously seeks new angles of approach, and practices the ability to perceive new affordances. (Folkestad, 1996, p. 46)

The above quote presents a way to discuss one aspect of musical creativity, one with significant relevance to the present study. To study how we perceive our musical instruments and how we use this perception to interact with the repertoire highlights the importance of these relationships in music making.

In Ways of listening, Clarke (2005) adapts Gibson’s ecological approach to visual perception to the perception of sound. Through a series of case studies he examines how the perception of music is dependent on acoustics, musical parameters and the social context in which the music is performed. The affordances of music offer various actions such as “dancing, singing (and singing along), playing (and playing along), working, persuading, drinking and eating, doing aerobics, taking drugs, playing air guitar, traveling” (p. 204). Clarke is however especially interested in how music affords meaning to the listener. Even if the listener is seemingly passive, the interpretive act itself constitutes the action
in the perception/action loop. In examples including Jimi Hendrix performance of Star Spangled Banner at the Woodstock festival 1969, Clarke argues that the perceivable sound actually conveys the intended meaning of the performance. Or rather, the sound affords the intended musical meaning if the listener possesses the cultural references to interpret the sounds in such way. This further challenges the notion of perceiving music on separate structural levels such as rhythm, pulse, timbre, and, on top of it all, musical meaning and cultural references. He argues: “people seem to be aware of supposedly ‘high-level’ features much more directly and immediately than the lower-level features that a standard information-processing account suggests they need to process first” (Clarke, 2005, p. 16). Through Clarke’s book, Gibson’s ecological psychology became more widely known within music research.

DeNora (2000) also refers to affordances in her book *Music in everyday life*, in which she effectively merges perspectives from sociology and psychology with ethnomusicology. Through ethnographic case studies – music therapy, karaoke sessions, an aerobics class and the background music in stores – she examines the multiple functions that music has in people’s daily life. DeNora (2000) refers to the affordances of music in an encompassing way: “music’s affordances – moods, messages, energy levels, situations – are constituted from within the circumstances of use” (p. 43-44). However, this interpretation of affordances has been criticised of meaning little more than “the colloquial concept of to evoke, or to elicit“ (Menin & Schiavio, 2012, p. 206). As a reaction against what can be thought of as a watered-down version of affordances, Menin and Schiavio (2012) argues instead for an understanding of musical affordances more closely connected to the interaction with physical material, such as musical instruments:

A skilled guitarist might be unable to say where to put her/his finger to perform a solo, but s/he can use the motor knowledge of the fingers to reconstruct the actual set of notes played, by just putting the hand on the strings. We believe that this sensory-motor process not only represents the basis of musical understanding, but it can also shed light on the notion of musical affordance, relying on a sub-cognitive, pre-linguistic, intrinsically motor form of intentionality. (p. 210)

In line with this argument, Huron and Berec (2009) draws parallels between the notion of idiomatic qualities and musical affordances:

A stretched-membrane drum, for example, affords a number of sonic possibilities. The drum may be struck with a hand or with a stick; it may be struck by a single hand, by alternating hands, by drumming the fingers, etc. The drumhead may be depressed with one hand (modifying the tension) while striking with the other hand; the side of the drum may be struck, and so on. (p. 104)
In Östersjö (2010), the collaborative processes between composer and musician are examined through his own artistic practice as a classical guitarist. Based on the analysis of a series of collaborations with different composers, Östersjö divides the interpretational act in two phases; (i) an analytic phase, and (ii) a practical phase. In the latter phase, Östersjö uses the concept of affordances to discuss the possibilities of certain tunings on the guitar. The affordances of these different tunings are explored by improvising on the musical instrument, searching for ideas to be used in the compositional process, through an act of *thinking-through-practice*, a term resonating with the close connection between perception and action as presented above. In subsequent studies, Östersjö has returned to the theory of affordances to discuss the influences of the properties of musical instruments in various collaborative projects (Östersjö, 2013; Gorton & Östersjö, 2016). Coessens and Östersjö (2014) articulates a way to understand the concept of affordances in the context of musician/musical instrument as “an instrument affords different musical possibilities to different performers; hence, the affordances of an instrument are as dependent on the individual performer as on the acoustic properties of the instrument” (p. 337).

Nilsson’s (2011) dissertation applies the theory of affordances on the design of – and interaction with – digital instruments. He discerns between these two acts as *design time* and *play time*. Design time refers to the construction of the digital instrument, and thereby the articulation of an aesthetic idea, whereas play time is the actual performance guided by both the preconceived possibilities of the instrument and the embodied knowledge of the performer. The instrument is a framework for this musical thinking and action. Nilsson (2011) is paraphrasing Merleau-Ponty, saying: “my instrument is my viewpoint on the music world, and at the same time, it is one of the objects in that world. It is my being-in-the-music-world.” (Nilsson, pp. 143-144). As presented above, the act of moving around in the environment is a vital part of perception according to Gibson. This locomotive aspect in Gibson’s framework can be seen as corresponding to a musician reacting to perceived musical events in real time. In his doctoral thesis on improvisation with digital instruments, Nilsson (2011) coins the term *emergent affordances*:

One thing that has struck me in numerous improvisations over the years is a musician’s ability to discover and take advantage of new things that may emerge during an improvisation. I call these new and unknown occurrences emergent affordances, and by this I mean the opportunity to make use of and exploit perceived qualitative changes in texture. (p. 255)

Nilsson’s idea of emergent affordances applies the concept of affordances to the relation between interacting musicians. While this aspect of musical collaboration may be highly distinguishable in the context of free improvisation, it is also difficult to imagine of any situation of live music performance where emergent
affordances have no relevance at all. It is also important to notice that this collaborative music making is not only dependent on auditory perception: “The behaviours of interacting musicians are simultaneously motivated and constrained by the collectively produced actions and resulting sounds: what is seen, heard and felt affords particular kinds of subsequent behaviour” (Windsor & de Bézenac, 2012, p. 10).

Nijs, Lesaffre and Leman (2013) combine the concept of affordances with a wider theoretical framework in order to study what is generally thought of as being the optimal relationship between the musician and the musical instrument:

A symbiosis between musician and musical instrument results from a growing integration of instrumental and interpretative movements into a coherent whole that is compatible with the body of the musician and with the movement repertoire of daily life. Such integration leads to the transparency of the musical instrument that just like “natural” body parts disappears from consciousness. (p. 1)

In order to theoretically frame the understanding of this state of interaction, the authors combine ecological psychology (affordances), activity theory, and research on flow and presence.

Investigating how affordances informs music making, Mooney (2010) adds the idea of frameworks: ”A framework is any entity, construct, system, or paradigm – conceptual or physical – that contributes in some way to the composition or performance of music” (Mooney, 2010, p. 144). The affordances of a framework are further organized from the easiest to the most difficult. As with the concept of effectivities discussed below, the idea of the framework runs the risk of compromising the powerful concept of affordances as reciprocally situated in between the subject and the object. Mooney does not explicitly address this issue, but he does however base this hierarchical structure on how easy these things can be done. From this follows that the construction of a framework must be subjective, since what one musician perceives as natural and easy, might demand much constrain from another. Seen from this perspective, the concept of frameworks provides a way to step inside the “double arrowed” idea of affordances in order to see its nuances, always uniquely organized depending on both the object and the subject.

Love (2017) studies the practice of improvising jazz musicians during a series of recording sessions. Through focusing on the “errors” made, defined as “a note or segment of several notes […] inappropriate in its context” (p. 36), he examines how the musicians perceive the referent, or the conceptual framework, of the solo. By looking at the referent through the theoretical lens of Gibson’s theories, it is clear that affordances furnish the basis for different actions depending on the perception and skills of the musicians.
On a fundamental level, studying affordances in a musical context prompts the researcher to take a stand in the debate on whether the concept of affordances carries meaning with regards to the interaction with manmade tools in complex cultural settings. Since Gibson’s own concern was to explore seemingly basic behaviour of animals as well as humans, this is a question of interpretation and extension of his original ideas. The difference between discussing whether water affords drinking (for humans) or landing (for insects), and discussing the playing of musical instruments may at first seem too wide to be examined by the same concept in a meaningful way. The affordances that are associated with playing musical instruments challenge the idea of perception as direct, since it could be argued that elaborate action in a cultural context is consciously constructed from the basis of the subject’s knowledge, thus, falling back on the view of perception as a three-term relationship as mentioned above. Accepting this view may render affordances in relation to musical practice irrelevant, as the assumption of a direct, non-representational view of perception is fundamental to Gibson’s ideas (1979/1986). This is a topic of debate among researchers (see Windsor & de Bézenac, 2012; Menin & Schiavio, 2012). Those whose conception of affordances includes cultural context make arguments similar to the following: “affordances are opportunities for action in the environment of an organism, the opportunities in question include everything the organism can do, and the environment includes the entire realm of potential activity for that organism” (Sanders, 1997, p. 108, in Windsor & de Bézenac, 2012, p. 4). Accepting this line of thought opens up a path to inquiries around affordances and perception/action loops in complex tasks in cultural contexts such as music making. I will return to this issue in Chapter 6, discussing it in the light of the empirical results from the interview study.

3.3. Affordances and learning

The adaption and development of the perception is a key feature in Gibson’s (1979/1986) work. According to this, the subject is constantly exposed to the environment and the existence is in itself seen as a learning process. Thus, the perception of a human being changes during their lifetime, which is essential for the child in order to explore the world and to develop motor skills. While Gibson’s work does not go into depth on learning, it is explored in depth by his wife Eleanor J. Gibson (1991). The two of them worked together in many publications and she continued to work on perceptual learning (including research on affordances) after Gibson’s death in 1979. She was particularly interested in the perception of infants and children:
We learn to perceive affordances of events, objects, and places (layouts) in the course of development. For example, a child may learn that a slope of more than 10° cannot be safely descended upright and on foot but can be negotiated by sitting and sliding. (E. J. Gibson, 2000, p. 295)

Learning processes, such as learning to play a musical instrument, may be more conscious and deliberate than the first steps of a toddler. Since perception is connected to action through the perception/action loop mentioned above, a person can learn to perform increasingly difficult tasks through challenging the perception:

Learning, Gibson argues, is to discover (sometimes with the guidance of others) and become attuned to, more and more subtle affordances. Whether one has the adequate effectivities or chooses to attend to them or not, the instrument does come with a set of carefully designed affordances which guide exploration and constrain action. (Windsor & de Bézenac, 2012, p. 8)

In other words, through practice, a musician will develop their effectivities and access new possibilities on their instrument. Note that the phrase sometimes with the guidance of others is put inside brackets. Since theories of perceptual learning are by default mainly concerned with exploration and development, the social dimension is almost non-existent. Gibson (1979/1986) himself comments on interaction between humans: “the affordances of human behaviour are staggering. No more of that will be considered at this stage except to point out that speech, pictures, and writing still have to be perceived” (p. 137).

3.4. Effectivities

Although Gibson (1979/1986) explored visual perception and the reciprocal relationship between subject and environment, the majority of his work concerns surroundings in the form of surfaces, substance and optics. It has also been argued that his use of affordances is inconsistent with his own writings. Sometimes affordances are described as a property of the environment/object, while he at other times, stresses the mutuality of the concept (Dotov, Nie & de Wit, 2012). Through the interpretation of affordances as an environmental condition (although directed towards the subject), other researchers have argued for the use of the complementing, but debated, term effectivities. The idea behind the critique against the introduction of the term is that by positioning effectivities on the subject’s side, affordances may be taken as explicitly part of the environment. If so, this reinstates the duality that Gibson sought to collapse. In this section, I will outline the history of the term effectivities and some of the various understandings used
by researchers. I will also present the operational definition that I use as an analytical tool in the present study.

Drawing from von Neumann’s (1966) self-admittedly vague concept of effectivities as the “the potentiality to do things” (p. 78), the term effectivities was first brought in to the context of Gibson’s theory of affordances by Shaw and McIntyre (1974) as “purposive activities” (p. 307) and was further elaborated by Michaels and Carello (1981). According to these researchers effectivities are “potential purposive behaviours … whether an animal flies, swims, walks, or slithers; whether it pecks, nibbles, sucks, or licks; whether it smokes, watches television, or mugs old people will ‘determine’ the affordances it can detect” (p. 42). In other words, effectivities are what make the affordances relevant for the subject; a person watching television will certainly not detect the same affordances as someone looking for old people to mug.

As outlined above, effectivities are sometimes described as action or behaviour. Michaels (2003) highlights two different uses of the term effectivities: (i) the actual actions involved in order to seize an affordance and (ii) the potential to make use of an affordance in the environment. The way that the introduction of effectivities informs the way we think about affordances is a critical point of controversy. If effectivities are understood as the subject’s ability or disposition towards the environment, it may imply that affordances are a property of the environment. Explained in the following way it clearly affects the way affordances is to be understood: “The animal’s effectivities are directed to the environment in the way that the environment’s affordances are directed to the animal. An affordance dispositional and an effectivity dispositional; the concepts complement each other and, thus, make a dual.” (Dotov, Nie & de Wit, 2012)

At the centre of the debate regarding (the usefulness of the term) effectivity lies the critique that effectivities abandon “what is most important and original about affordances by dispensing with the double arrow” (Dotov, Nie & de Wit, 2012, p. 31). As pointed out by Sanders (1997), “affordances, properly understood, do not need to be ontologically complemented with effectivities and that the certainly vital role of intention in perception – and in activity in general – is already implicit in the idea of affordance” (p. 105). This critique is vital. If effectivities are to reimpose the duality of subject and object, then the value of affordances as an analytical tool is restricted to being a mere list of physical properties (such as size, form and weight) of an object which are to be measured against the physical abilities of the subject. This notion of affordances tells us very little about the complex ways in which we interact with our surrounding environment in a deeper sense. However, going back for a close reading of Michaels and Carello (1981) reveals another position: “The affordances of an object, place, or event are the

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behaviours it invites or permits by virtue of its structure, composition, position, and so on — and by virtue of the animal’s effectivities” (p 159). Here affordances are intimately connected to action, and are dependent on the environment as well as and on the effectivities of the subject. Thus, effectivities understood in this way do not dissolve Gibson’s (1986) idea of affordances as collapsing the dualistic approach of the object and subject divide. Effectivities defined in such way renders the following critique from Sanders (1997) irrelevant: “differentiating between affordances on the outside and effectivities on the inside is precisely the kind of thing that Gibson thought to be a muddle of thought” (p. 104). If one seeks to find a duality in the definition by Michaels and Carello (1981) above, it is rather found in the relation between the objective properties of the environment and the effectivities of the subject – while affordances still bridges this gap. Furthermore, the construct of effectivities as “goal-directed behaviour” (Michaels & Carello, 1981, p. 106) brings to the table a way of discussing and understanding the subject’s active involvement with the environment, allowing the researcher to study both unique individuals and their change. Since the relationships between musicians and their musical instruments are not static, this is of uttermost value in studies such as the present study.

Windsor and de Bézenac (2012) define effectivities in this area of research as the music-maker’s “physical characteristics, abilities, needs and sensitivities” (p. 7) and also briefly address how effectivities can be used to describe the process of the relationship of the musician to their instrument:

Musicians change their effectivities through the development of new perceptual sensitivities and levels of motor complexity. One needs only to look at the numerous compilations of technical exercises and study books used in Western classical music education to see an example of this. (pp. 8-9)

To summarise the use of effectivities, I return to Michaels (2003), who states that “it must suffice for the current purposes to acknowledge that the effectivity ground is shifting, so it would be wise to keep an open mind and await developments” (p. 141). This leaves the researcher with the need for devising his or her own definition of effectivities, drawing from the body of research presented above. It needs to include everything that has bearing on the relationship between the musician and the musical instrument. In line with the idea of direct perception, these parameters are not referenced in the act of perception as in a three-term relationship (see above). Rather, these parameters are inherently part of the subject and directly inform the perception/action loop. Based in this view, I will use the following working definition of effectivities as a point of departure and thus to position the use of the term: *everything that informs the subject’s relationship to the musical instrument, and hence defines the affordances in this relationship*. This definition is intentionally broad, and as such it requires empirical research in
order to distinguish the structure and processes that substantiates effectivities. Michaels (2003) highlights a question that is central to any theoretical discussion: “is this a substantive theoretical debate or simply an issue of what one wants the term effectivity to refer to?” (Michaels, 2003, p. 142). In order to contribute to a substantive theoretical debate, I will draw from the analysis of the empirical material in present study and return to this issue in the discussion (Chapter 6).

3.5. Summary

In this chapter, I have given an account of the theory of affordances as it was originally formulated by Gibson. Some examples of research applying affordances to a musical context have been presented and the theoretical consequences of the various approaches have been explored. The concept of effectivities, by some seen as controversial, has been presented and discussed. At first effectivities may seem incompatible with Gibson’s aim of collapsing the subject/object divide, but as the discussion above reveals, it is a relevant analytic tool in the present study. Furthermore, some terms have been introduced; thinking-through-practice, emergent affordances, and perception/action loop. These are, although not used by Gibson himself, seen as idiomatic to his ideas. In the next chapter, I will present the methodology and design of the study, including its connection to the theoretical framework.
4. Methodology, design and analysis

In the previous chapter, I outlined an understanding of the theoretical lens used in the present study. In this chapter, I will describe how this exploration was carried out. I start by presenting the reasons behind my choices, the methodology, and how the chosen methods connect to the theoretical framework. The chapter also contains short biographical introductions to the interviewed flutists as well as presentations of the flutes discussed in Chapter 5. Although these flutes show a lot of variation, they all fall into the category of the simple-system flute as discussed in Chapter 2.

4.1. Methodological considerations

In the first research question - How do flutists talk about their approaches to, and the possibilities of, the simple-system flute? – lies an assumption that the musical instrument actually does have a fundamental role to play in the musical processes examined, otherwise it would be futile to use the instrument as a focus for the study. That means that the instrument is central to the conducting and the analysis of the interviews. From the theoretical framework presented in Chapter 3 follows that the methods used should allow the researcher to get as comprehensive descriptions as possible regarding the relationship between the musician and the musical instrument. Gaining understanding from what the informants tell and show me as a researcher about their relationship with their instrument requires a hermeneutically inspired approach. Formulated by Friedrich Schleiermacher (1768–1834) hermeneutics is the art of interpretation, originally aimed at understanding biblical texts. Wilhelm Dilthey (1833–1911) expanded this area of focus to include “human life itself, conceived as an ongoing process of interpretation” (Brinkmann, Jacobsen & Kristiansen, 2015, p.21). Affordances, constituting the theoretical framework of the present study resonates with fundamental hermeneutical principles, which could be formulated as: “we always see things as something, human behaviour as meaningful acts, letters in a book as conveying some meaningful narrative” (Brinkmann, Jacobsen & Kristiansen, 2015, p. 21). The hermeneutic aim to understand requires the crucial need to acknowledge the subjective position of the researcher, as the pre-understanding
becomes an unavoidable point of departure for the interpretation. The fundamental principle of this interpretive process is the hermeneutic circle (sometimes referred to as the hermeneutic spiral), which illustrates a dialogue between the expectations from the interpreter and the meaning of the text (Laverty, 2003). Thus, my own background as a flute player becomes a vital consideration and a central tool. I elaborate on the implications of this position in section 4.6. The hermeneutic circle aims at reaching a meaning that makes sense and is free from internal contradictions (Kvale & Brinkmann, 2009). However, hermeneutics is not a recipe of methods, but “an explication of general principles found useful in a long tradition of interpreting texts” (Kvale & Brinkmann, 2009b, p. 211). Although not considered as a method, it is a stance of research framing the choice of methods and informing the design of the study.

4.2. The qualitative interview

The empirical data of the present study is the result of six semi-structured interviews. According to Kvale and Brinkman (2009), these interviews can be conducted either as an inquiry into a hypothesis, or as an open exploration around chosen themes. The experience explored in the interviews can be shared through thorough descriptions and it is the researchers challenge to grasp the meaning of these descriptions (rather than merely collect statements of facts) (Kvale & Brinkman, 2009).

In order to facilitate as comprehensive descriptions as possible, I was inspired by Houmann (2010; 2015) and her use of three-dimensional objects as a focal point for interviews exploring the phenomenological life-world of her informants. Prior to the interviews, the informants in her study had created models from various objects such as cans, paper cups, pens, and post-it notes, in order to “describe the work of the multifaceted music teacher” (Houmann, 2015, p. 127).

The models came to provide a life-world in a concrete form, which simultaneously offered the possibility to create a distance, making the familiar unfamiliar and holding the key to the life-world “in the hand” during the interviews. As a researcher I had the opportunity to open up the life-world of the informants through these models. (Houmann, 2010, p. 209, my translation)

In the present study, the models mentioned above will be replaced by musical instruments. The presence of the flutes during the interviews was of importance as the interviewed musicians are first and foremost practitioners in the field of music.

In order to frame their way of talking about and demonstrating their practice, inspiration can be drawn from Schön’s (1983) seminal book, *The Reflective Practitioner*. In his work, Schön critiques the technical-rational paradigm, which
is the dominant way of thinking about knowledge at the universities in the Western world. He argues that this “heritage of positivism” (p. 31) has led to a crisis regarding the status of professional and practical knowledge. In the technical-rational way of thinking, practical knowledge is seen as a mode of problem solving. However, Schön points out that the technical-rational paradigm omits the phase of problem setting, which in fact is a prerequisite for problem solving: “Problem setting is a process in which, interactively, we name the things to which we will attend and frame the context in which we will attend to them” (Schön, 1983, p. 40). In this way, Schön highlights the process of problem setting as an inherent part of practical knowledge. This has a bearing on the present study, since what the interviewed musicians state as technical solutions to what must be understood as results from how they already have framed the problem. In other words, when they for example talk about articulation and air management, it is reflections of the requirements relevant to their musical context. Schön further makes a distinction between reflection-in-action and reflection-on-action. The former is the way we reflect upon what we do as it happens, while the latter refers to the reflection that takes place after the event. These two modes of reflection are highly relevant with regard to the interviews of the present study. The statements made during the interviews span both of these modes of reflection. Statements belonging to the latter category are often related to teaching practice (such as private lessons, workshops and university courses). These statements are concrete in terms of technical instructions, and easily verbalised for the interviewed musician. Statements derived from reflection-in-action are combined with the playing of the flute. The act of playing works as a reminder of what the musician is actually doing, which they then can put into words. On some occasions, the playing constitutes the answer itself and has been transcribed and included in the presentation of the results (Chapter 5).

In a similar way, Johansson (2008) incorporates the musical instruments in her interviews. The musicians in her study make four different kinds of statements: (i) verbal statements, (ii) verbal statements illustrated by playing, (iii) musical statements accompanied by talking, (iv) musical statements. These various forms of statements enabled her to study “both what was said about music in words, and what was expressed in music through playing” (p. 71). The statements interpreted in the present study consist of all of these four categories. Furthermore, the fact that I played the flute during the interviews possibly helped to facilitate the musical statements. For example, on some occasions, I repeated what the interviewed musician demonstrated, or we played together in order to attempt some techniques discussed. This approach is similar to how Sæther uses the fiddle in order to deepen her relationships with the children participating in the El Sistema project that she follows as a researcher (Sæther, 2015).
4.3. Design

Informed by the theoretical underpinnings of the chosen methodological path, I will here present the design and procedure of the present study.

The following experience that occurred during a tour of Brittany in 2015 provided initial inspiration for the interview concept used in this study. During a collaboration with my trio, Nos Honks, and guitar player Gilles Le Bigot and flute player Jean-Michel Veillon (one of the interviewed musicians in the present study), I had the pleasure to discuss flutes and flute playing with Veillon. Veillon is a seminal flute player in Breton traditional music and during one of these informal conversations, we started to talk about Veillon’s career and which flutes he had used during certain periods and on certain recordings. This topic opened up themes such as aesthetic preferences, the intimate relationship between musician and musical instrument, availability of new and old flutes, commercialism, international connections, and negotiations with instrument makers concerning aesthetic visions (personal conversation with Veillon, April 2015). Using the flute(s) as a point of departure and as a constant point of reference, the conversation became a life-story focusing on the heart and soul of his musical career. Without the intention of doing so, this private conversation proved to be a pilot interview.

This experience gave me the initial idea to use the flute as a tool in the interview situation. To have the instrument at hand during the interview situation also enabled the interviewed musicians to make statements through more than verbal means. I have previously used this method when exploring flute player’s teaching methods in traditional Irish and Breton music (Tullberg, 2007). At several occasions, the interviewed musicians took up the instruments and showed me fingerings, examples of postures, melodic phrases, and other aspects of their musical practice.

In order to facilitate such a variety of statements, I asked the interviewed musicians to bring their flutes to the interviews. I also brought my own flute and played one or two tunes in order to demonstrate my own musical practice and this was also a way to present the background of the study. Hardly surprising, the interviewed musicians shared the curiosity directed at the musical instrument, a fascination that underlies the present study.

4.4. The interviewees

The flutists in the study are: Jean-Michel Veillon (FR), Conal O’Grada (IR), Anna Roussel (FR/SWE), Andreas Ralsgård (SWE), Lisa Beznosiuk (GB), and Stéphane Morvan (FR). The interviewed flutists all contribute with their experiences as
situated in different musical contexts: Veillon in Breton traditional music; O’Grada in Irish traditional music; Beznosiuk in historical informed performance (19th-century) of Western art music; Ralsgård in Swedish traditional music. Roussel transitioned early in her career from Breton to Swedish traditional music and this change of musical context brings yet another perspective. Morvan offers a flute makers perspective on the contemporary design and making of simple-system flutes. They have been asked to be part of the present study since they all have been involved in the processes of establishing the simple-system flute in their respective genre or tradition. Whether it has meant implementing the instrument in a genre where it has not been present before, or if it has been a process of revitalising the instrumental tradition within a genre, varies between these musicians. But for all of them, stylistic development and careful aesthetic consideration have been part of their career as musicians.

The following section provides short biographical introductions to the interviewed musicians. It also presents the flutes that are discussed in this chapter. In order for the reader to be able to follow the different flutes as they appear throughout the text, they are provided with a code. Except for these reoccurring flutes there are also flutes mentioned in the text that are not as frequently referred to.

### 4.4.1. Interviewee 1: Andreas Ralsgård

(b. 1973)

Born in Skåne, the southernmost region of Sweden, Ralsgård was educated as a saxophonist at Ingesund School of Music in western Sweden. As a flute player, he has been working with both Swedish and Irish traditional music. He currently teaches at Landskrona municipal cultural school (Landskrona kulturskola) and Skurup’s folk high school (Skurups folkhögskola). He has released recordings with Swedish traditional music with his ensembles *Mats Berglund trio* and *Ralsgård & Tullberg*. Andreas Ralsgård is a friend and colleague of mine since fifteen years ago and we have collaborated intensely over the years, primarily through our duo *Ralsgård & Tullberg*.

The interview with Ralsgård was conducted in his home in Smörhålan, Sweden February 23, 2017. The flutes that Ralsgård mainly refers to are two modified German flutes, one modern Rudall & Rose type flute made by Francois Baubet, and one 19th century flute made by Swedish maker Iacob Valentin Wahl.

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13 Reading the thesis as a PDF allows the reader to use the search function in order to follow a certain flute through the chapter.
FL RA 1: Modified German flute. (Figure 5)
FL RA 2: Modified German flute with foot piece by Tim Adams, Sweden. (Figure 6)
FL RA 3: A Rudall & Rose type\textsuperscript{14} flute made by Francois Baubet. (Figure 7)
FL RA 4: A flute made by Iacob Valentin Wahl. Wahl was based in Landskrona in Sweden. His workshop produced flutes as well as other wind instruments. (Figure 8)

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure5.png}
\caption{FL RA 1}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure6.png}
\caption{FL RA 2}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure7.png}
\caption{FL RA 3}
\end{figure}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure8.png}
\caption{FL RA 4}
\end{figure}

\textsuperscript{14} “Rudall & Rose flutes” refer to the original instruments while “Rudall & Rose type flutes” refer to flutes made by other makers based on those flutes.
4.4.2. Interviewee 2: Lisa Beznosiuk

(b. 1956)
Beznosiuk found her passion for early music during her studies at Guildhall School of Music, London. Her teacher, Stephen Preston, introduced her to one-keyed baroque traverso as well as the simple-system flute and she is now one of the world's leading performers on early flutes. As a soloist and orchestral principal she has performed and recorded a wide range of 18th and 19th Century repertoire on a variety of historical flutes from her own collection with many well-known ensembles. She is also a passionate and dedicated teacher, holding positions at the Royal Academy of Music, Royal College of Music and Guildhall School.

The interview with Beznosiuk was conducted in her home in London. March 3, 2017. Although Beznosiuk has a rather extensive selection of flutes, the ones mostly referred to in the next chapter are an original Rudall & Rose flute and an original Thibouville flute.

FL BE 1: Flute made by Rudall & Rose in London, England c. 1840. (Figure 9)
FL BE 2: Flute made by Martin Thibouville in France c. 1840. (Figure 10)

4.4.3. Interviewee 3: Anna Roussel

(b. 1983)
Roussel was born in Brittany, France. After studying classical music on the Boehm flute during high school, she took up the simple-system flute due to her interest in Breton traditional music. She worked as a flute teacher in Brittany before she moved to Sweden in order to pursue an education in Swedish traditional music. After one year at Bollnäs Folk High School (Bollnäs
folkhögskola), she studied at The Royal College of Music, Stockholm in Sweden were she stayed for three years, gaining a Bachelor degree in Swedish traditional music. During these years, she adapted her playing technique from Breton flute playing to Swedish traditional music under the guidance of teachers playing Boehm flute and saxophone. After completing her Bachelor’s degree, she stayed in Sweden and worked with traditional music in various ensembles. She released a CD with each of the two bands Skaran (with a cellist and a nyckelharpa\textsuperscript{15} player) and Nos Honks (with myself and a saxophone player). She moved back to Brittany in 2014.

The interview with Roussel was conducted in her home in Belz, Brittany, March 24 2017. In the interviews, Roussel mainly refers to her Rudall & Rose type flute made by Stéphane Morvan. Also, her Geert Lejeune flute is mentioned.

FL RO 1: Rudall & Rose type flute made by Morvan in 2005. (Figure 11)
FL RO 2: Eb flute made by Geert Lejeune, Belgium. (Figure 12)

4.4.4. Interviewee 4: Stéphane Morvan

(b. 1970)

In his youth, Morvan played Breton traditional music on bombard and binioù\textsuperscript{16}. Eventually he became interested in Irish traditional music. While working as a freelance musician in those genres, he started to experiment with flute making. For

\textsuperscript{15} Nyckelharpa is a keyed violin common in Swedish traditional music.

\textsuperscript{16} Bombard is a double-reed shawm instrument with conical core and Binioù is a small high-pitched bagpipe. These two instruments are often played together in Breton traditional music and are associated with loud volume.
a long time, he made flutes only for himself, but in 2005 he started to work professionally as a flute maker. The interview focused on his work as a flute maker and the connection between the development of his instrument design and his aesthetic vision. The close collaboration with Breton flute players has been, and still is, vital to his progressive approach.

Since I was fortunate to meet Morvan at his home, I was given a tour in the workshop where he could show me the tools and material used in the making. By explaining the use of the equipment, he took me through the basic principles of his work. The interview afterwards was conducted with the help of Anna Roussel, taking the role of interpreter. I either asked questions in English directly to Morvan, upon which he answered in French, or I asked Roussel to translate both the questions and the answers. She did not translate what said word by word, but inevitably she used her background and pre-understanding of the issues discussed to translate the meaning of Morvan’s answers, sometimes in a concise manner. The audio/video recording of the interview and the transcription thereof was sent to her in order to adjust some of her translations.

The interview with Morvan was conducted in his workshop and home in Elliant, Brittany, March 25, 2017. Below is a picture of Morvan’s second model, which is referred to in the next chapter. Roussel plays a flute of his first model (FL RO 1), and Veillon plays a flute of his third model (FL VE 4).

FL MO 1: Morvan’s flute based on a Boosey & Co.’s 19th century Pratten model. This flute is referred to in the text as his second model. (Figure 13)

**4.4.5. Interviewee 5: Jean-Michel Veillon**

(b. 1959)

Veillon was born in Eastern Brittany. As a child he was child he was a bombard player and dancer of Breton dances. He started to play the flute after hearing the playing of Michael Tubridy on recordings of the Chieftains. He strongly influenced the emerging flute playing in Breton traditional music during the 1980s and 1990s through his work with ensembles such as Kornog, Den, Barzaz and Pennou Skoulm, as well as through his solo recordings.

I collaborated with Veillon in 2014/2015 when my trio, Nos Honks (in which Roussel is part) toured Sweden and Brittany together. The tours were preceded by
a number of rehearsals in order to work on a joint repertoire to be performed in the upcoming concerts. This collaboration was also the context for the conversation that functioned as a pilot interview described above. When I interviewed him in 2017, I knew Veillon and was familiar with some aspects of his playing.

The interview with Veillon was conducted in his home in Kerhuel in Pédernec, Brittany. March 26, 2017. In the next chapter Veillon refers to his first flute, a one-keyed flute from the 19th century. His second flute was made by Bruce Du Ve in the 1970s. Veillon also refers to a Rudall & Rose type flute made by British maker Chris Wilkes in the 1990s, and his recent flute, made by Morvan.

FL VE 1: One keyed flute, made by Jean Daniel Holtzapffel in 19th century Paris. (Figure 14)
FL VE 2: Flute made in 1970s by Bruce Du Ve (Ireland) with one key added. New head piece made by Hamilton. (No picture)
FL VE 3: Rudall and Rose type flute made by Chris Wilkes, 1990s. (Figure 15)
FL VE 4: Flute made by Stéphane Morvan. Referred to as his third model (see 5.2.3). (Figure 16)
4.4.6. Interviewee 6: Conal O’Grada
(b. 1961)
Born in Cork, there were very few flute players around when O’Grada first took up the flute and he was encouraged and inspired by musicians on other instruments. He established himself as a distinct voice on the Irish traditional music scene and through his rhythmic style he inspired many flute players to develop this aspect of the music. Today, he teaches flute at University College of Cork. He also teaches privately as well as at a primary school. Beyond this, he also offers individual tuition via Skype. He has released two solo recordings as well as two recordings with his band Raw Bar Collective.

The interview with O’Grada was conducted at The Ionad Culturtha Arts Centre, Ballyvourney, October 2, 2017. O’Grada refers to two flutes – his original Rudall & Rose, as well as his present flute made by Hamilton.
FL OG 1: Rudall & Rose flute with a Fentum head piece (both made in 19th century London). (No picture)
FL OG 2: Flute made by Hammy Hamilton 2011. (Figure 17)

Figure 17
FL OG 2

4.4.7. The question of anonymity

I have chosen, with consent from the interviewees, to use the true names of the interviewed musicians. The reason for this is two-fold. First, all of the interviewees are highly profiled professional musicians in their respective field. They all have unique and individual background stories that would be hard to anonymise. De-contextualising their statements in such way would also compromise a crucial aspect of the study since these backgrounds are vital to understand their approach to the instruments. Second, using the proper names also allows the reader to locate recordings, books, interviews and other sources, adding to the information conveyed here.

However, by choosing to use their names, I have taken some things into consideration that would otherwise be irrelevant. A few statements regarding flutes, flute players and makers were clearly made to me in person and intended to be off the record. Some of these statements would have been of interest to add to the results, but they would have exposed the interviewed musicians in ways that
would break the trust between researcher and interviewee. Although these statements would support my theoretical discussion in chapter 6, they would not alter or contradict the arguments presented.

4.5. Analysis

The six interviews generated a vast amount of empirical data of audio/video recordings. The duration of the interviews varied between approximately 60 minutes to 180 minutes. All interviews were audio/video documented using a Zoom Qn4 recorder. Transcriptions of interviews one to four were conducted using Quicktime and word, while transcriptions of interviews five and six were done in nVivo (version 11.0.0). The analysis of the data was conducted using nVivo.

As presented in 4.1, the qualitative research approach and, thus, the analytic process of the present study is inspired by the hermeneutic tradition, where the interpreter is co-creating the meaning from the horizon of his or her understanding (Kvale & Brinkmann, 2009). I see the analytic process as focused around some fundamental phases. As recommended by Silverman (2014), I began the analysis by focusing on a small amount of data. This “intense analysis […] provide[s] a good initial grasp of the phenomena” (Silverman, 2014, p. 114). The initial data consisted of the transcription of the first interview (Ralsgård) and the analysis provided an idea of what themes potentially could become central to the study. Having identified such themes, I realised that there were segments of the interview that would benefit from further questions. My close relation with Ralsgård allowed me to deepen the understanding of his statements about those themes through further communication. While maintaining the open attitude, this initial transcription and analysis provided some guidance in the conducting of the following interviews, and thus commencing the extended analysis (Silverman, 2014).

After the first reading (or watching/listening), of this material I searched for units of general meaning. These units can be defined as “those words, phrases, non-verbal or para-linguistic communications which express a unique and coherent meaning (irrespective of the research question) clearly differentiated from that which precedes and follows” (Hycner, 1985, p. 282). The units of general meaning that emerged in this phase were then summarised into a few words or a sentence (Kvale & Brinkman, 2009). Through similarities found among these units of meaning, they could be combined into clusters of meaning, from which themes emerged (Hycner, 1985). Underpinning this procedure was the pendulum movement between the parts and the whole of the hermeneutic circle.
This was of essence in order to put the discrete statements into context and to gradually expand the horizon of my understanding.

The computer program nVivo is constructed with the qualitative researcher in mind. It facilitates a structuring of the analytic process, through in-built tools for coding. It also allows for a close relation between the transcribed text and the video recording. This makes it easy for the researcher to reference the video segment of a certain statement. Frequently during the analysis, it was required to get audio/visual support for the interpretation. This is of course especially true regarding statements directly involving interaction with the flutes, such as playing, demonstrating fingerings, and pointing at certain physical features of the instrument.

As presented in Chapter 3, there is a lack of research regarding more detailed studies on affordances regarding the interaction between musicians and their musical instruments. Even though there is a theoretical framework informing the perspective of the analysis, the themes and patterns emerging are not resonating against fixed categories of affordances. Rather the results from this analysis will be reviewed from the theoretical landscape presented in Chapter 3. Thus, I worked with an inductive approach in order to further deepen the theoretical understanding of musical affordances. The theoretical discussion resulting from this application of the theory will be presented in Chapter 7.

A draft of the thesis, with the complete results chapter was sent to the interviewed musicians for them to read and comment upon. This was done in order to verify that my quotations and interpretations of their statements were correct, in the sense that their intention behind the statements was conveyed. This procedure also gave the interviewed musicians the possibility to clarify their statements and to add further comments. All of the interviewed musicians responded with feedback.

4.6. My position as a researcher

My close relationship to some of the participants in the study has been clarified in the presentation of the interviewed musicians. For the sake of transparency, there might be good reasons to discuss the implications of this fact from a methodological point of view. However, there are other, perhaps more fundamental principles regarding the researcher’s role in all qualitative research, and especially in hermeneutical inspired approaches, that makes it necessary to explicitly address my position towards the subject of study. My background as a flute player and teacher of flute informs my pre-understanding and thus, my point of departure in the analysis. Being a flute player specialised on the simple-system flute allowed the interviewed musicians to make detailed descriptions regarding
playing technique. We also had a shared knowledge about the simple-system flute in terms of history of development and different models. My specialisation in Swedish traditional music, and a rather extensive background also in Irish traditional music, positioned me closer to some of the interviewed musicians. This pre-understanding is an interpretational point of departure that undoubtedly forms the understanding of the empirical material. A researcher with different background would certainly interpret the statements differently, according to his or her pre-understanding. That said, adopting a hermeneutically inspired research approach simultaneously acknowledges the existence of “a legitimate plurality of interpretations” (Kvale & Brinkmann, 2009b, p. 213). The fact that I knew, and had collaborated with, some of the interviewed musicians demanded me to be careful, both during the interviews and in the analysis. I had my own idea about their approach towards their instruments, but strived to put that aside; I asked questions although I thought I knew the answer and had them demonstrate what they said through their flutes although I know their playing fairly well. I was surprised by what surfaced during the interviews.
In this chapter, I present the results from the analysis of the interviews with the musicians in the study in order to answer the first research question: *How do flutists talk about their approaches to, and the possibilities of, the simple-system flute?* I will first (5.1) address the issue of finding a satisfactory instrument, as this is a foundational condition in the discussion of its affordances.

As will soon be obvious, the availability of simple-system flutes has increased significantly since the 1960s. Where the interviewed musicians are based, also impacts the availability of flutes. In 5.2, I present what the interviewed musicians say about various historical and contemporary flute models and makers. Section 5.3 explores issues of playing technique such as air management, articulation, and fingering. The reasons behind, and the different approaches towards the modification of their instruments are presented in 5.4, while other issues, such as cracks and maintenance problems are dealt with in 5.5. Perception of interpretative possibilities in the repertoire are presented in 5.6 followed by the recurring question of how much sound can be attributed to the player and how much can be attributed to their flute. (5.7). Finally, thoughts on the theme of utilising exploration as a learning strategy emerging in the interviews are presented in 5.8.

The musicians are not representatives of anyone but themselves. At the same time, what they say about their flutes and what they musically demonstrate during the interviews is framed by the musical context in which they work and the background that they have. In this way, a wider context is visible through their individual statements. The aim of this chapter is to provide an insight of the things that were brought up and stressed by the musicians themselves, rather than to provide an exhaustive description of all aspects of the interviewed musicians’ flute playing.

The character of the statements is subjective, in the sense that they convey the experience of the interviewed musicians. They are expert musical practitioners with limited knowledge (which they acknowledged themselves) about the scientific principles of the instrument. Stéphane Morvan is an exception since he researched these matters as part of his professional development as a flute maker. During the interviews, all of them comment on this fact. However, their statements are no less precise and “true” to their experience as professional musicians. It is
my intention to present these statements in a way that makes sense, while still providing an insight to the subjective nature of the relationship between the musician and the musical instrument. Following from this, I have used the words of the interviewed musicians themselves as much as possible. This is the story they tell, or rather the story they tell in words and through their flutes.

5.1. Finding a flute

The interviewed musicians have different stories regarding the process of acquiring flutes. Topics such as aesthetic preferences, availability of flutes, the emergence of modern day makers, and the second hand market of original 19th and early 20th century flutes are entwined in these stories. As is obvious from the stories told, much has changed during the time span covered by their careers. Also, where the interviewed musicians were based, and what international connections they established had an impact on the possibility of acquiring good flutes.

5.1.1. Original flutes

Before the advent of contemporary makers, original flutes were the only simple-system flutes around, and good instruments were rare. When Veillon got his first flute, these instruments were scarce, as was information about them. He received his first flute (FL VE 1) when he was a teenager from a school friend. He was thrilled, not knowing that in fact it was a one-keyed flute suited for the old fingering system, and not the kind of flute that he had heard on the Chieftains LPs.

I was amazed. An instrument for me! You know you have to consider [that] at that time it’s not like now when you have young people getting instruments – not at all the situation then. So to get this instrument, I was ahhh! And I had some information from people – no internet of course – saying you have to oil it. Oil it? I didn't know what to do. I remember having bought a bottle of linseed oil, which is not very good for that by the way. And I started to take care of it more. (Veillon)

As mentioned in 2.1 simple-system flutes remained in production in Germany well into the beginning of the 20th century. They were mass-produced and the manufacturers targeted amateur musicians. When O’Grada started to play the flute in the late 1960s there were not many flute players in Cork and the availability of flutes was also low. There were no contemporary makers yet, and most of the flutes available were instruments of poor quality, which he jokingly refers to as “sticks”. Most of them were mass-produced flutes from Germany.

As described in 2.1, 19th century London had a thriving flute-making industry. One of the most successful flute-making firms of that era was Rudall & Rose. Of
limited availability in 20th century Ireland, Rudall & Rose flutes were rare treasures for flute players there. As mentioned above, the vast majority of flutes available in Ireland during O’Grada’s youth were of German origin. O’Grada himself was lucky to come across an original Rudall & Rose with a head piece made by Fentum (FL OG 1):

To tell you exactly there was this English man who used to buy flutes in England in second hand shops and bring them over here. So he brought a lot of Rudall & Roses over. A lot of people would get flutes from him. And then people started making them. (O’Grada)

Thus, due to one individual, there was a slight increase in availability of high quality flutes from the 19th-century London.

As will be further explored in 5.4, Ralsgård decided to acquire German flutes due to his interest in Swedish traditional music (see 5.2.4). This was around the year 2000, and German flutes were easy to find at flea markets and through internet sites. Furthermore, friends that knew he had an interest in these type of flutes offered him complete or incomplete (FL RA 1 and FL RA 2). Flutes were cheap and available, but Ralsgård needed to restore and modify them himself. Except for the import of German simple-system flutes, Sweden had its own domestic production of simple-system flutes during the 19th century, although original flutes from Sweden are quite rare today. A couple of years ago, however, an instrument collector offered Ralsgård a flute made in Landskrona (Sweden) in the 19th century by Iacob Valentin Wahl. Ralsgård bought the flute and had it restored by a professional woodwind repairer (FL RA 4).

5.1.2. Simple-system flute by contemporary makers

As presented in 2.1, some pioneering flute makers started to make simple-system flutes during the 1970s in order to meet the increasing demand for good flutes from Irish traditional musicians. Before that, however, flute makers had started to make one-keyed flutes as part of the revival of early classical music (see 2.1).

Playing both one-keyed transverse flutes and simple-system flutes, Beznosiuk first comments on the increasing number of modern day makers specialising in the production of high quality copies of baroque and classical flutes. Starting with copies of one-keyed flutes, some makers also progressed into making copies of multiple-keyed classical flutes. On the question of whether the availability of flutes has increased during Beznosiuk’s career, she answers:

Yes, I think it has. Particularly with baroque and classical flutes. Instrument making has developed and improved a great deal. When I started my career, there were few
flute-makers making copies of classical keyed flutes, for example those by Heinrich Grenser\textsuperscript{17}, and none making copies of later 19th century flutes. So I was obliged to buy and play originals. I imagine that the Irish players also generally played on original flutes until there were good copies available from makers such as Chris Wilkes. (Beznosiuk)

Although Beznosiuk has had the opportunity to acquire good original flutes, she very much appreciates the modern copies, because they are more readily available, of a high quality and are more reliable to play.

These flutes [keyed classical flutes] work brilliantly now. In the earlier part of my career I would often struggle when having to play on original flutes with their old springs, pads and idiosyncrasies. Nowadays, with the rise in popularity and interest in period performance there is a healthy market for excellent copies of historical instruments by contemporary makers. And for this reason, I have often found myself in a situation where my flutes aren’t as good as those of my students. (Beznosiuk)

More specifically, Beznosiuk refers to the mechanics on modern produced flutes as superior (i.e. they keys and springs). Beznosiuk perceives the situation as slightly different in regard to the simple-system flutes. According to her, modern makers of flutes based on models by Rudall & Rose modify the original design to meet the demands of the market for traditional Irish music. This results in an instrument that is not necessarily suitable for orchestral players from the classical tradition who are required to use all the keys and play in tune with a consistent sound through the range of three octaves. She is also very satisfied with her original Rudall & Rose and has not considered the option to buy a modern version:

Maybe [if] one of those [modern] makers [targeting the market of Irish traditional flute players] would make a true copy of that [referring to the original Rudall & Rose flute that she holds in her hands]. But I don’t know if they would. (Beznosiuk)

O’Grada’s friend, Colin (Hammy) Hamilton, was one of the pioneers to take up the making of simple-system flutes at the end of the 1970s: ”It meant that we could get whole flutes, recent flutes, which is a big change I suppose. The old flutes were poor flutes: German flutes, and you know, cheap flutes, bad flutes.” Being satisfied with his own original Rudall & Rose flute (FL OG 1), he continued to play that instrument for thirty-five years. He did not switch to a modern-made flute until that flute started to crack during his travels: “I needed a flute that I could rely on to travel with”. He continues to state that, today the making of flutes is not just taking place in Ireland: “Now there are several makers. Lots of great makers actually, all over Europe.”

\textsuperscript{17} Heinrich Grenser (1764-1813) was a flute maker based in Dresden, Germany.
Through the folk music wave of the 1970s, connections between Ireland and Brittany became stronger. Veillon made his first trip to Ireland in 1976 and purchased a flute from a flute maker named Bruce Du Ve, who by then had begun making keyless flutes for Irish traditional musicians. When Veillon toured Northern Ireland with his band Galorn a few years later, he met Hamilton, who later visited Veillon in Brittany and made a new head piece to go with the Du Ve flute (FL VE 2).

As previously discussed, Ralsgård, being based in Sweden, had limited possibilities to acquire high quality simple-system flutes that were in playable condition. There were not many flute players in the folk music community in Sweden by the end of 1980s and the early 1990s, and therefore very few simple-system flutes around and even fewer for sale. In the struggle of getting an instrument, Ralsgård travelled to Ireland and purchased his first simple-system flute; a Pakistani-made flute without keys. Not satisfied with this flute, he decided to buy an Irish made keyless flute two years later (by flute maker Desi Seery). After having discovered the traditional flute history of Sweden, he later travelled back to Ireland together with a friend and brought home more flutes. At that time there were a number of well-established makers of simple-system flutes and good instruments were available in music shops.

5.1.3. Flute makers in Brittany

As the simple-system flute became more established in Breton traditional music, the end of the 1980s saw the first flute makers in Brittany. Among them was Gilles Léhart who was a bombard and binioù maker. Veillon played several of Léhart’s flutes, especially the models made in tonalities other than D major. Although Veillon himself continued to play flutes by makers from abroad as well, he recognize the flute makers in Brittany as an essential part of the process of establishing the simple-system flute in Breton traditional music:

I wanted more makers in Brittany. I thought it would be good for flute players here. You know, when people say that I am responsible for flute playing here, it is a serious reduction of reality. It is because of the flute makers […] without these people, no instruments [would be readily available]. (Veillon)

Veillon also appreciated the possibility to collaborate more closely with makers in Brittany, and eventually settled mainly for the flutes of Stéphane Morvan, with whom he has collaborated closely.

Born in early 1980s, Roussel became interested in flute playing in Breton traditional music by the time several makers in Brittany had began the commercial manufacture of simple-system flutes. Thus, it was easy for her to order her first flute from Gilles Léhart. Léhart even offered the possibility to buy a flute without
keys, which could be sent back in order to add keys at a later stage. This meant that the beginner could buy a keyless flute comparatively cheap and then progress to a flute with keys without having to adjust his or her playing technique to another flute. When Roussel first received her flute, her hands were too small to easily cover the holes properly. The flute stayed unused in a box for a couple of months before she decided to give it another try. This was the start of a process of adjusting her technique and posture in order to find a position where her fingers could cover the holes. She describes it as a rather painful and frustrating process. As a teacher, Roussel also taught children from the age of six on smaller flutes (in G) that are produced by makers in Brittany for children with hands too small to cover the open holes of a full size flute. Roussel herself ordered a flute from Stéphane Morvan in 2005, which she still plays (FL RO 1).

5.1.4. Collaboration with flute makers

The emergence of modern day makers of simple-system flutes provides a possibility for processes of collaboration and negotiation between makers and musicians. This is a theme that is reflected in the interviews in different ways.

O’Grada is a friend and a neighbour of flute maker Colin “Hammy” Hamilton. O’Grada plays one of Hamilton’s flutes himself and is sometimes asked for his opinions on Hamilton’s work: “Hammy wants me to drive a new model sometimes”. However, he estimates his influence upon the end result as “very marginal”, since he generally finds the flutes very good.

Of the interviewed musicians, Veillon is the one that has been most involved in collaborations with flute makers. During his career he has encountered varying interest from different makers. He gives an example of when he approached a maker with the idea of trying out new things regarding the design of the instrument:

He wasn’t clearly saying no, but he would start long technical explanations, basically saying no. He was convinced that it was the way it had to be done. He didn’t want to lose time experimenting. Many flute makers, once they have their model and know that it works, they don’t want to change things - which I understand. (Veillon)

The idea to have a progressive relationship with makers lead Veillon to a long-term collaboration with Morvan. Morvan, he explains, was (and still is) open to experiments and since the two of them live close to each other, it is possible to meet in person frequently.

During the interview, Morvan explains that he used to be open for customisation on individual basis, adapting each flute according to requests from his customers. Gradually, he has moved away from that practice in order to realise
his own vision. This has evolved together with a few flute players, among whom Veillon is one. Morvan is confident in his own vision and knows that his flute model is a great choice for some musicians, while others may be better off trying something else. He has initiated collaboration with a jeweller who makes the keys for his flutes. When that division of labour is up and running, it will probably be possible to customise the looks of the key work.

The situation is different for Ralsgård. Experimenting with his instruments (see 5.4), he has sought to collaborate with makers and woodwind repairers in Sweden. There is one Sweden-based maker of keyless Irish flutes who has made a new foot piece upon Ralsgård’s request. Repairers of other woodwind instruments have helped Ralgård with modifications of the keys according to his own specifications. In general, Ralsgård considers the lack of interest and competence regarding simple-system flutes among woodwind makers and repairers in Sweden to be a limiting factor for further development.

5.2. Flute models

In Chapter 2, I outlined the historical context of the simple-system flute. The musicians in the study refer to historical flute models, either as original flutes or modern instruments based on those models. Historical models and makers are mentioned either in geographical terms (London, Germany, Vienna, and France) or in terms of makers (Rudall & Rose, Boosey & co., Thibouville, and Meyer). The historical London-based manufacturers, Rudall & Rose and Pratten, also appear as design concepts discussed in distinction to each other.

5.2.1. Historical connection

Beznosiuk specialises in the repertoire of Western art music of the 18th and 19th century and has informed herself on the historical context of this repertoire. Preparing a performance, she undertakes further research in the background of a particular piece and has an extensive selection of flutes and parameters that will inform her choice of flute for the performance. These include: (i) where the composer was working, (ii) if there were particular flutists that the composer would have in mind during the composition process, (iii) time and place for the original performance, and (iv) later performances of the same piece. While she is historically-oriented, she also has a pragmatic approach to the findings of her research:
A date can make a difference. It’s not that I want to play exactly the same flute as the original player. But I want to find out if it is possible. And if it is possible, I’ll try to do it. (Beznosiuk)

Regarding what is possible or not, she continues to explain:

The biggest argument for me is that I have to play in a concert with a conductor who is used to the reliability and power of modern instruments. And then there are live recordings, TV and radio. There are certain standards of expectation. We can’t just say, ‘it wouldn’t have sounded very good’ or, ‘you wouldn’t have been able to hear the flute’. That’s another aspect of the challenge. How pure and “authentic” is it wise to be? (Beznosiuk)

She concludes: “That’s one of the advantages of living in this century – having a choice.” Her choice of instrument is thus a consideration of both the historical context as well as the contemporary performance context.

5.2.2. Rudall & Rose and Pratten

Rudall & Rose flutes are talked about in two ways during the interview – as the original flutes made by the London flute making firm during 19th century, and as an instrument design concept associated with certain qualities. Beznosiuk plays an original Rudall & Rose flute [FL BE 1]. She considers her Rudall & Rose flute to be a very flexible instrument:

You could do anything with this flute, they [Rudall & Rose flutes] are such good instruments. And I think it’s this flexibility which makes the Rudall & Roses so special. It’s remarkable. I can play it in Berlioz, that quintessentially French composer, and can make it sound ‘French’. It’s also clear and powerful in a Brahms Symphony. At the same time, all the Irish players I have ever shown it to covet it because of its clear, reedy bottom register. They just want to take it straight to the pub. Though they probably wouldn’t be interested in playing chromatic repertoire in the upper registers. It’s just remarkable. It can do a lot of things.

As mentioned above, she considers the contemporary Rudall & Rose type flutes as being only loosely based on the originals (in contrast to the modern copies of Baroque and Classical flutes). As mentioned above, she argues that the majority of the contemporary makers of simple-system flutes are aiming towards the market of Irish traditional flute players thus striving to adapt the original model to other musical demands. This is in line with the story of how Morvan worked out the design of his Rudall & Rose model, the first flute he made. Morvan based this

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18 The word authentic is accompanied by the gesture of quotation marks.
Rudall & Rose model on a flute by Fentum\textsuperscript{19} (Roussel plays on a flute of this model of Morvan, FL RO 1). During the process of designing his Rudall & Rose flute, Morvan felt the need to deviate from the measures of the original flute and he modified the intonation of some notes (he perceived A and B to be too sharp and F# too flat).

Rudall & Rose, as a concept, is most clearly articulated in the interviews with Veillon and Morvan. Both of them attribute certain qualities to Rudall & Rose (and Rudall & Rose type) flutes, often contrasted with Pratten (and Pratten type) flutes. Veillon describes the Rudall & Rose flutes in the following way: “There’s kind of a halo around the Rudall [& Rose], but you have to control it to be in tune. You know what I mean, it’s delicate. So you cannot just blow, you have to be careful.” Ralsgård adds to the same idea: “There’s a delicacy in the Rudall & Rose flutes that the Pratten doesn’t have - complexity of sound.” Roussel also compares the two concepts in a similar way: “I like the finesse that my [Ruddal & Rose] flute (FL RO 1) has that the Prattens don’t have”. She elaborates on the topic saying that she perceives it as if there are more harmonics in the sound of the Rudall & Rose type flutes, compared to the Pratten type flutes. She continues to say that she considers the Rudall & Rose type flutes to be harder to play in tune, since air pressure needs to be controlled more in comparison to playing a Pratten flute.

Beznosiuk adds that, looking at the vast output of the Rudall & Rose company, the flutes vary a lot regarding hole sizes and other features: “If you look at Robert’s [Bigios] book\textsuperscript{20}, “Rudall & Rose” mean several types of flute.” O'Grada, who played an original Rudall & Rose for thirty-five years (FL OG 1) adds:

I don’t know really. My Rudall & Rose had large holes like that (pointing at the flute in his hand, FL OG 2). I find I get more or less the same sound out of any flute, no matter what flute it is. You chase the sound you want and that's what you get. I don't really see the difference in the result, you know. (O'Grada)

Summarising the above statements shows that the idea of Rudall & Rose as a design concept, to be used by contemporary makers, is more homogenous than the idea of original Rudall & Rose flutes as perceived by O'Grada and Beznosiuk (who both played on original instruments). The homogeneity of the design concept Rudall & Rose, seems to be most clearly discerned in comparison to the Pratten design.

In contrast to Rudall & Rose flutes, Veillon perceives Pratten flutes to have rounder and bigger sound. They also consume more air: “The Pratten is like a machine. It’s strong and easier to play in tune. But you have to feed it too”.

\textsuperscript{19} Fentum flutes were made in London during the same era as Rudall and Roses.

\textsuperscript{20} Bigio, R (2011).
Morvan’s second model was based on an original Boosey & Co. Pratten flute. He experienced this flute to be generally easier to play than the previous flutes he had played. He was further inspired to develop this model due to its flexible sound and dynamic range. A blend of Pratten and Rudall & Rose

Contrasting the concepts of Rudall & Rose and Pratten paints a picture of two designs at polar opposites regarding air consumption, timbre, sound volume and intonation.

The contrast of these qualities, considered as inherent to the two models, prompted Morvan to develop a model that combined the best qualities of both; the complex timbre and the modest air consumption of the Rudall & Rose and the sound volume, and easy intonation of the Pratten. The result is the model of flute played by Veillon today (FL VE 4), although Morvan continuously adds minor changes in the design to further realise his vision. When asked whether he refers to his model as a Pratten type or a Rudall & Rose type, he answers that it is neither of the two, but rather a combination of both. From this statement, I reply: “So it’s the Morvan model?” He hesitates, arguing that he has borrowed so much from the 19th century makers that he cannot claim this model to be his own.

Morvan’s flutes have one middle piece instead of two, a feature associated with the Pratten design. To him it is preferable to divide a flute into fewer parts, if possible. He explains that on a Rudall & Rose model, it is necessary to divide the middle section into an upper and a lower part, due the shape of the bore. I ask why he still has a separate foot piece instead of having one long part consisting of both middle pieces and foot piece, thus minimising the number of joints. He gives two reasons for this: (i) it is hard to find such long pieces of wood, and (ii) the bore is wider at the end of the foot piece (a reverse conical shape compared to the bore of the middle piece). This makes it necessary to have a separate foot piece in order to be able to drill the bore. Morvan summarises his vision: “The most important thing is that the musician is able to forget about the instrument itself”. Thus, an overarching goal in the process is to create an instrument that becomes as transparent as possible.

5.2.3. German flutes

Three of the musicians referred to German flutes. Beznosiuk briefly mentioned that she is not happy with an original Meyer flute she has on loan, and would like to get a better one. As mentioned above, O’Grada refers to the flutes available in

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21 The original Pratten flute that was available to Morvan was tuned higher than today’s standard pitch (A=440), which hindered him from simple measurement and reproduction of this flute. He had to make his model slightly longer than the original and, as a consequence resize the finger holes. The model based on the Boosey & Co. Pratten flute was Morvan’s second model (FL MO 1).
Ireland in his youth as German flutes, and not very good instruments. Ralsgård has paid more attention to the German flutes. Both FL RA 1 and FL RA 2 are German flutes. He explains that this type of flute was played by flutists in Sweden during the 19th century and existed alongside the Boehm flute well into the 20th century. In Sweden, when flutes are found at flea markets, in the attic or in the drawers of people’s homes, they are most often this kind of flute:

I had a strong idea that ... if I am going to play and explore Swedish music ... I mean, this is the kind of flute that was used [pointing at FL RA 1 and FL RA 2]. And if you go to an auction, a flea market or to Blocket and Tradera the German style flutes is what you’ll find rather than old London flutes. So I decided to go in on that.

He then felt the need to modify the German flutes that he bought in order to adapt them to play the Swedish repertoire. He enlarged the holes (see 5.4) to alter the tuning and the volume and states that: “In a way I have still sought to make it play like these (pointing at FL RA 3 and referring to Rudall & Rose type flutes), since I have enlarged the holes. You know, it’s not just a tuning matter, it’s also a matter of timbre.” He describes the sound of those flutes (FL RA 1 and FL RA 2) as “veiled” – a timbre he associates with one-keyed baroque flutes – rather than the “shiny” sound of the “London flutes” (i.e FL RA 3). The veiled timbre is even more present in the flute made by Wahl (FL RA 4). Ralsgård’s statements may seem peculiar: why search for a particular kind of flute, only to modify it into something else? While asked about this, he explains that there are still differences in timbre between the two models, even after his modifications. There is also a visual aspect that is important; the most striking difference between the German flutes and what Ralsgård refers to as London flutes (i.e. Rudall & Rose flutes) is the pin mounted keys (see 2.1.1). By finding German flutes in Sweden and adapting them to his playing style, Ralsgård made connections to the flute playing in Swedish traditional music of the past, while at the same time distancing himself from the Irish flute playing: This is not to be understood as a dislike for Irish flute playing (Ralsgård plays a lot of Irish music) but rather as a way for himself to, at this time in his career, find a new and different path: “this flute (FL RA 3) goes right into the Celtic thing.” The pin-mounted keys on German flutes are also easier to change and modify than the block-mounted. The woodwind repairer working on Ralsgård’s flutes has been able to use parts from clarinets which are much more easy to obtain in Sweden.

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22 Swedish internet sites for trading
5.2.4. French flutes

Beznosiuk is the only musician in the study that refers to old French flutes - more precisely her original Thibouville flute (FL BE 2) (see 2.1 for a general presentation of the French simple-system flutes). In the following quote she comments on the playing qualities of the instrument, and makes a comparison between French flutes in general and her Rudall & Rose:

I have sometimes found myself wondering if this French flute, [FL BE 2] would be loud enough in a big concert hall, because it is definitely not as powerful as the Rudall Rose, which seems very loud close up. But in fact, good French flutes possess wonderful, lustrous and carrying qualities which might not be apparent to the ear of the player, but which sail out over the orchestra, especially in the middle and top registers. (Beznosiuk)

She exemplifies by playing in the second octave and then continues:

The French flutes are good [...] but the trouble is that they do not have much potential for change or variety. There is one sort of sound which works extremely well on them – beautiful, exquisite and lustrous tone quality – and that’s it. What makes the Rudall & Roses so special is the variety and potential in their sound. (Beznosiuk)

Since she finds it possible to call forth the sound of the Thibouville flute also on her Rudall & Rose, she sometimes uses it to play the French repertoire: “I can create the quality of the French flute on this flute (FL BE 1), but it is just there on this one (FL BE 2).”

An interesting feature of her Thibouville flute is the F# key. The flute has small finger holes in order to facilitate cross fingerings and it is possible to produce F natural using the fingering [234/24]. However, Beznosiuk perceives the F sharp [234/2] to be flat due to the small fifth finger hole. This can be improved slightly by opening the F keys. Her Thibouville flute does however have another key designated only to improve the intonation of F# (Figure 18).

![Image of French flute](image.png)

**Figure 18**
The F# key on FL BE 2. Referred to as the Tulou key.
This key is operated with right hand little finger. Playing an F# using the key is thus fingered [234/25e].

5.3. Playing technique

All of the interviewed musicians go into detail about playing technique. How they talk about their technique, and what they emphasise, varies. Central themes that emerge revolve around the usage of air, articulation techniques, intonation, and fingering.

5.3.1. Air volume and air pressure

The blowing of air into the flute is what produces the sound. Hence, it is a central aspect of flute playing. As a flute maker, Morvan divides playing styles in two fundamentally different categories depending on the volume of air and air pressure produced by the player (i.e. if a player blows “hard” or “soft”). Depending on these parameters, different demands are put on the flute’s design. The flute players that he has collaborated with most closely have been blowing “very hard” and thus he has adapted his flutes to that style of playing. Today, however, he strives to make his model meet both sets of demand.

Morvan’s comments are reflected Veillon’s experience of switching from his Du Ve flute (FL VE 2) to a flute made by Wilkes (FL VE 3), which was based on a Rudall & Rose model). When he switched flutes, Veillon had to rethink his usage of air:

So adapting to the Chris Wilkes flute, the main thing was to blow less hard. Softer. And ... it’s ... because I started to blow softer, the whole aesthetics... of what I was playing... I started to realise that power is not loudness. (Veillon)

During the interview with Beznosiuk, she allowed me to try her French Thibouville flute (FL BE 2). I picked up the flute and noticed its small finger holes. Judging from this parameter, I tried to blow gently into the flute, searching for a good way to handle it. However, Beznosiuk laughed at me, saying: “You can’t do that to it”. I wondered what she meant and she explained to me that I was blowing “fast and through.” She demonstrated by taking the flute back and playing a phrase. “It’s a question of less air and changing the speed of the air and changing the volume of the air. And that is how the music works as well.” On a one-keyed transverse flute, every note requires a certain approach, and thus has its own potential of volume and colour. Beznosiuk considers this to be true to a varying degree regarding simple-system flutes too, especially those with small holes, such
as her Thibouville flute (FL BE 2). Even though I tried to meet the demands of the flute, I was so used to blowing “fast and through” that it was hard to adapt. She continues: “If you want to blow through, you need something with large holes, like that [pointing at my flute]. Or even a modern flute [i.e. a Boehm flute], where all notes are the same”. Thus, there is a distinction between my own Breton flute (made by Morvan in 2014 and similar to FL VE 4) and the French Thibouville flute (FL BE 2). Beznosiuk traces this distinction back to the evolution from the one-keyed flutes, whose design puts even more demands on the usage of air. Blowing too hard on a flute that is not designed for it will make for an “uncontrolled intonation and ugliness in the tone”. Then she sums up the reasoning with almost the same conclusion as Veillon: “A good sound is not necessarily a loud sound; it’s rather a colour.”

5.3.2. Air management and breathing

Air management refers to the relation between air usage and music that is being played. In other words, the techniques used to ensure there is an adequate supply of air for a given musical purpose.

O’Grada plays traditional Irish music, where there are no prescriptions of where in the melody to take a breath and taking a breath often means taking out a note and thereby creating a gap in the melody. O’Grada names the process of finding the possible places to insert breathing gaps (and working them in to the adaptation of the tune), as finding the breathing pattern:

The first thing I do is to find the basic breathing pattern. And I play that over and over again until I have that breathing pattern. So then it is, OK, now I can play the tune. So then you work from there. How are you going to change that? (O’Grada)

Thus, the breathing pattern is not static but something that may be changed by the musicians based on what makes musical sense:

It is like a pause in speech. Because when you are speaking and you have a pause, you have just said something that is important, or you are about to say something that is important. And it’s the same in music. (O’Grada)

He continues to see similarities between the lungs of a flute player and the bag of the *Uilleann pipe*:\n
You use 50% of your air for playing flute and 50% for staying alive. And there's a good reason for that, because it means that you are strong all the time and that is

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23 A kind of bag pipe common in Irish traditional music.
reflected in how you play. As your lungs empty, you start making compromises. But if you are always full, you can be strong all the time. (O’Grada)

By always keeping his lungs relatively full, the pauses made while inhaling can be made more subtle and controlled: “It means that when you take a breath, you take it very quickly, and you have much more control over your breathing and your breaths are not obvious.”

Instead of adhering to the above guideline, Veillon discusses those compromises that O’Grada touches upon. In order to temporally extend a note when he is reaching a shortage of air, Veillon vents the note\textsuperscript{24}. He exemplifies this by playing E\textsubscript{1} [234/23] and while the note gets weaker he produces a vibrato by opening and closing the Eb-key [234/235a]: “This flange\textsuperscript{25} keeps it in tune. It’s acceptable, and at the same time I spend much less air and I can stretch my note.”

Ralsgård points out that the technique of air management is more important than having a huge lung capacity. Having that control creates the possibility to keep long melodic lines, while still being able to breath inside the phrase. He picks up the flute to demonstrate (Figure 19):

![Flute demonstration](image)

\textbf{Figure 19} 
Ralsgård demonstrates how short breaths can be taken without interrupting the melodic line. The breaths are indicated by pauses.

Ralsgård continues to say that flute players new to Swedish traditional music run the risk of being susceptible to rhythmic instability. He demonstrates this by playing a phrase and goes on to explain that even though the rhythm may be noticeable, it is not emphasised enough: “You cannot grasp that sound, the rhythm is there, but nothing is happening to it”. Ralsgård refers to a number of Irish flute players that have been inspiring for him, saying that: “In their way of playing, the breathing mechanisms […] is allowed to be heard”.

\textsuperscript{24} Venting is the technique of using a key to open a hole below the lowest open finger hole. This is usually made in order to make the note stronger and/or sharper. Veillon vents the note in this case to maintain the tuning of the note while he runs out of air.

\textsuperscript{25} By “flange”, Veillon associates the sound created with the electronic music effect \textit{flanging}.
5.3.3. Glottal stops and finger articulation

In O’Grada’s terminology, articulation refers to the interruptions of the air column that take place both inside the body as well as outside (through finger articulations). O’Grada does not use the tongue to articulate at all, only glottal stops\(^{26}\) and finger articulation\(^{27}\). He adds with a smile: “If I have students in my class and they use the tongue, I kick them out.” That the fingers are seen as a natural part of the articulation system is explicit in the following interview excerpt where we talk about two different ways of fingeriing the note C2:

O’Grada: “I suppose the key I need most is the C-natural, but I actually prefer this C natural [34/\]. Because I can articulate that, and I can't articulate that [2/2b].”

Tullberg: “You cannot articulate that [2/2b]?”

O’Grada: “No, to cut the C natural you have to go to D. If you use the key, you cannot get to the D.”

The logic behind this statement is the following. To be able to perform a particular finger articulation called a cut, the note being articulated must be fingered in such a way that it allows for a very quick grace note above. Trying to cut the C2, produced by using the key would lead to the following fingering combination: C2 [2/2b] to D2 [34/234] and back again. Since the desired effect of the cut is only to articulate the main note (C2) and not to be perceived as a note in itself, the finger movement producing the cut needs to be extremely quick, almost percussive in gesture. The relation between the two articulation techniques (glottal stop and cuts) is further explained: “A cut and a glottal [in combination] is the heaviest, then a cut is next and then the glottal”. When asked about his use of glottal stop, he refers back to the fact that there were almost no flute players in Cork when he first started and that he took inspiration from musicians who played other instruments as well as from older recordings that featured players using glottal stops. He explain that it fits musically very well to the playing of polkas, a characteristic of the music from the Cork area: ”You can get that off beat which is essential to polkas”.

As some notes on the flute inherently weaker than others, O’Grada compensates this through articulation techniques in order to provide “a hard edge in front of the note”. For example, the weak character of the note E can be compensated by “scraping from a lower note”, in this case the strong note of D (Figure 20):

\(^{26}\) Glottal stops are produced through the closing and opening of the glottis.

\(^{27}\) Finger articulation refers to the quick opening and closing (or closing and opening) of one or more finger holes. This movement does not result in a separate note or grace note but as a rhythmic effect.
Compensating a weak E by "scraping from a lower note".

In striving to make repetition interesting, O’Grada uses different articulation techniques on repeating notes. In the following phrase, he demonstrates differing ways to articulate a repeating note (Figure 21):

The fingering used to produce the cuts in front of the repeated F# in bar three and four are (1) [23/2], (2) [24/2], and (3) [34/2]. O’Grada mentions a fourth alternative [234/2], but adds that: “I find that if you use something that is further away, you will get more differentiation.” By this he means that the hole that you quickly uncover and cover again in order to produce the cut should not be the adjacent to the holes which remains open while playing the main note (the fingering for F#2 being [234/2]).

5.3.4. Using the tongue

Roussel does not use the glottal stop as she considers it to be physically uncomfortable and hard to control: “It’s like when you see a tennis ball hitting the floor covered in red dust. You just see the red dust all over the place.” Instead she discerns between the articulations produced by the tongue in terms of consonants. She does not talk about them in terms of how heavy they are, but rather how accentuated they are, T28 being the most accentuated followed by D29 and K30 (which she uses mainly on grace notes). Roussel also refers to her transition from Breton to Swedish traditional music and the technical challenges that followed. Although the consonants used (and the combinations of these into double and

28 /t/ as in “tea”
29 /d/ in “do”
30 /k/ as in “cat”
triple tonguing (exemplified as “TaKaTa” and “TaKaDa”)) were familiar to her, the placement of the articulation in the tunes was not. She describes this as a phase of relearning: “That is the hardest part really, [to] understand what to do and when to do it”.

Ralsgård highlights the need to use different consonants in the different registers on the flute. When he plays the note D1 he usually uses G31, while higher up in the register, he tends to use either D or T. He elaborates on the use of different consonants: “You also have to get away from the idea of double and triple tonguing as something you just do to repeat a note. I always have the tongue work in different places.” He also refers to the need to adapt the articulation depending on which flute he plays. The differences are obvious between his Baubet Rudall & Rose type flute (FL RA 3) and the flute made by Wahl (FL RA 4). He thinks the former requires a heavier movement of the tongue than the latter.

Veillon adds the idea of reversed tonguing. That is, instead of starting the tone with a consonant, using the consonant at end the tone (“haT, haT”). He also stresses the need to adjust the articulation depending on the musical context (whether he is, for example, performing Irish or Breton tunes), and depending on what instruments are played by other musicians. This is also true regarding the individual style of the other musicians: “If I play with a fiddle player, using this short bowing style, I’d chop [the column of air] more. And if it would be a legato style piper, I would play it more fluid.” He goes on to talk about bad habits of articulation and how sometimes he articulates in a way that he is not completely aware of: “It puts me in a rage when I think, ‘why do I do that when I know I shouldn't?’ I hear that I am bumping and I am not playing fluid enough. I have to think: ‘put the tongue down in the mouth’, and that’s it.”

5.3.5. “The blue sausage”

Veillon presents the idea of “the blue sausage”, a visualisation of the air column. It starts in the lungs and extends through the throat and the mouth, passes between the lips and goes all the way to the tip of the flute (Figure 22). Along the way, the player has opportunities to interrupt the air stream – “to articulate the column of air”: the player controls the breath from the lungs; the throat provides the possibility to cut the air column by glottal stops; in the mouth, the tongue has the possibility to articulate through the use of various consonants; and the lips provide yet another possibility to interrupt the air before it leaves the body. Finally, the blue sausage passes through the flute, where the fingers can be used to articulate it further.

\[31 /g/ as in “go”\]
The column of air, and the possibilities to interrupt it, starts in the lungs, passes through the throat and mouth before it extends through the flute. This is the perspective on the column of air referred by Veillon as “the blue sausage”.

5.3.6. The challenge of intonation

All the interviewed musicians discussed, to some degree, the challenge of intonation. Technical considerations of this topic are also presented in other sections, but here I explore some of the thoughts about intonation in a more general sense.

Beznosiuk highlights the fact that different flutes require different approaches on certain notes. This is especially critical while using more than one flute in one concert:

Changing flutes is one of the challenges of my life. I have to remember which one is which, where the strengths and weaknesses lie and where the intonation is on each one … because they’re all different. And then it’s as much with the embouchure as with the fingering. Actually, it’s mainly with the brain. I have to remember that the middle D is very flat on that one [pointing at FL BE 1] because of the low B joint. It’s no good remembering these things after you’ve played the note - that would be too late. So it’s like cycling or skiing or something … always being ready to adjust, quickly. Every flute is different and the intonation is in a different place. (Beznosiuk)

Beznosiuk also adjusts the tuning on the instrument using the tuning slide, depending on which register she is going to use - even if only for a short section:

Sometimes you have solo that goes very high and very low and that’s very annoying on this flute [referring to FL BE 1] because it is flat at the bottom. So usually, I push it in [the tuning slide] for the low bit and pull it out again as soon as I can. (Beznosiuk)

Ralsgård makes a comparison with the violin: “I think of it as playing the violin – all notes must be corrected all the time. You need to have your ear turned outwards.” The corrections he refers to are made through small changes in the
embouchure. Roussel also talks about intonation as constant corrections in pitch. Beyond a flexible embouchure, she adds the possibility of rolling the flute inwards and outwards as a means to correct the pitch down and up, respectively. She says that she has learned to navigate the intonation on her own flute, and although she has spent much time on issues of intonation, the means of corrections are automatized.

5.3.7. Alternative fingerings

As mentioned in 2.1, the simple-system flute can be defined as having a hole for each of the chromatic notes, some of which are covered by the fingers and some by keys. This means that, strictly speaking, all notes in the first two octaves can be produced without the use of cross fingerings. However, the interviews reveal that cross fingerings are hugely relevant for some of the musicians, while not at all for others. The two musicians in the study that discuss cross fingerings and other alternative fingerings the most are Veillon and Beznosiuk. Their background and approach are however significantly different. Roussel discusses cross fingerings as a means to alter the intonation of certain notes, which is a practice that she sometimes applies when playing Swedish traditional music. O’Grada mentions cross fingerings and half holing techniques as a way to produce notes otherwise not possible to achieve on his Rudall & Rose with non-functional keys.

For Beznosiuk, cross fingerings are an inherent part of her playing technique. Before she started to play the simple-system flute, she played one-keyed transverse flutes, where cross fingerings are essential in order to play in any other key than D major. Beznosiuk has several flutes and she points out that flutes with smaller holes (for example FL BE 2) are more suited for cross fingerings than flutes with large holes (for example FL BE 1). For example, on her Rudall & Rose (FL BE 1), she would never play F natural using cross fingering [234/24], since the holes are too big and it would be much too sharp. In fact, in the two first octaves, the only cross fingering she uses on this flute is C natural [34/]. Cross fingerings are more useful on her Thibouville flute (FL BE 2), due to the smaller holes. Advice on fingerings is also a big part of the literature that she has researched and still refers to. This includes tutors and instructions written by flute players of the 19th century. In the discussion during the interview, she refers to Fürstenau as a particularly useful source with regard to fingerings. There are three reasons why she would choose to use a cross fingering: (i) intonation, (ii) colour (timbre), and (iii) fingering patterns. The different fingerings provide a way to adjust the intonation of a note. However, as she explains in the following quote, what might be perceived as an intonation issue in the ensemble might be about timbre:
My experience is that I might decide on the “perfect”\textsuperscript{32} fingering at home. In my private practice it will work well, it will sound good … it will be “perfect” [as above] and I might write it into the music. And then, at the rehearsal with the rest of the orchestra, it doesn’t work. Because, maybe, I am not in tune with the horn, or the oboe. Or perhaps I need to play it extra loud or extra soft because of the context, and this affects the intonation. Playing on your own is not the same as playing in a group with other people. Sometimes a different colour is desirable. On these flutes, there is a certain amount of personal choice with regard to fingerings, but the player also needs to consider particular sound qualities inherent in the fingering. For example, if you play a top F and the clarinet is also doing it an octave lower, if the colour does not match, it will sound like an intonation problem. It’s often simply a blending issue, where one of us will have to change in order to make it successful together. But if I were on my own, I wouldn’t change it. (Beznosiuk)

She goes on to explain that, for her, it is essential to have a big repertoire of fingerings in order to be able to adapt to a situation as the one described above. In order to demonstrate, she plays the following phrase, four times (Figure 23).

![Figure 23](image)

Beznosiuk demonstrates four different fingerings for C3.

Each time she uses different fingerings to produce C3: \([2/2a]\), \([3/234]\), \([24/24]\), and \([24/234a]\). The adjacent notes will also impact the choice of fingering for a particular note. She exemplifies this through playing the following bars from Beethoven’s Eroica Symphony (Figure 24):

![Figure 24](image)

Beznosiuk demonstrates alternative fingering for F2 in musical context.

The third and fourth bar exemplifies the problem of the successive notes D/Eb-F-Ab. Using the keys to produce F2 will either require the use of the left hand little finger to open the long F key \([2345b23]\), or the right hand ring finger to open the short F key \([234234a]\). However, to play the D2, the right hand ring finger is used to cover the sixth finger hole, and to play the Ab2 in bar four, the left hand little finger hole.

\textsuperscript{32} The word \textit{perfect} is accompanied by the gesture of quotation marks.
finger is used to open the Ab key. This means that to play the above phrase using the keys requires either the right hand ring finger, or the left hand little finger to do a quick sideways movement. To avoid this, Beznosiuk uses the cross fingered F2 [234/24]. She refers to this fingering as the “old fingering” as this is the way she is used to play F natural on her one-keyed flutes. For certain passages, the decided fingering may need to be noted down in her sheet music (Figure 25).

![Figure 25](image)

*Figure 25*  
A passage showing Beznosiuk’s handwritten notes.

The large repertoire of alternative fingerings is particularly important in the high register (C3 and above). The fingerings for this register differ significantly between flutes as well. A note in the first two octaves that she comments on is F#. When possible, she opens the F keys (one or two) when she is playing F#. This raises the pitch slightly, which she considers to be necessary. On her Thibouville flute (FL BE 2) there is an F# key for this reason (see 5.2.5).

Veillon frequently incorporates cross fingerings in his playing. He does not refer to older sources, such as Fürstenau, but rather to his own background. His first flute (FL VE 1) did not have any (working) keys and, in order to play the music of his ensembles, he had to use cross fingerings. When he got his second flute (FL VE 2), a short F key was added (see 5.4.2). However, this was far from enough and he still had to find out other ways to produce the notes:

So here I was with new a flute with just one key, but not the key I had on the first flute. And that one and only key made me develop lots of alternatives. I kept putting my imagination to work all the time and with Kornog, I started to find ways to use that key as much as possible. (Veillon)
This phase of intense experimentation made the practice of using cross fingerings an inherent part of Veillon’s playing technique. Even today, when he has keys for all chromatic notes, he still uses many cross fingerings. He highlights the potential to change the colour of the sound by using cross fingerings, since these notes are weaker than the ones produced using a key. Adjusting the embouchure can further bring out this shift in colour. He exemplifies this by the following example (Figure 26):

![Figure 26](image)

Veillon provides an example of alternative fingerings for Bb1 and F1.

Here Veillon uses two different fingerings for the note Bb1, none of which uses the Bb key on his present flute. When Veillon performed the tune with the group Barzaz, he played on a flute without Bb key. He played the phrase using the following fingering for Bb1: 1 = [24/234] and 2 = [2(3)]. The first fingering variant [24/234] comes with a nodding gesture, and a relaxed embouchure. This large physical movement gives the pitch a wave like form. The note produced by half holing [2(3)] has a similar effect due to a slight sliding movement of the left hand long finger. On the flute that he played at the time [FL VE 2], he would sometimes finger the F1 (3) at the end of the phrase by half holing [234/2(3)]. However, this solution was more feasible on that flute, since it had bigger holes. On his present flute he would use the standard fingering [234/23a], but using the long F key to give it what he calls “a small flange” [2345b/23a], sharpening the note slightly. He explains that the cross fingerings gives the phrase a colour it wouldn’t have when using the standard fingering. “I want to play it in a way that would be less precise in a way. And I can enhance this effect with the embouchure, releasing it, making it be a bit more hazy.”

After playing fragments of different tunes for a while, obviously searching for a suitable phrase or passage, Veillon provides an example of a situation where he has used alternative fingerings in order to produce a more fluid ornamentation. He settles for a composition by violin player Jacky Molard. In this tune, Veillon played in unison with Molard, who made a very quick trill on G#2 in the following passage (Figure 27):

![Figure 27](image)

Veillon providing an example of alternative fingerings in order to facilitate the desired ornamentation on G#2.
When he tried to perform the trill using the G# key, he experienced this to be too slow and the result was too accentuated in relation to the more fluent quality of the trill produced on the violin. In order to produce a trill that blended together with the sound of the violin, he used the following fingering for G#2: [23/23]. He was then able to produce the ornament using right hand index and middle finger. He regards the note produced by the alternative fingering to be less in tune than that of the standard fingering [2345a/]. However, he concludes: “In the musical flow, it works”. Veillon also uses an alternative fingering for C3 [24/243a] in the above passage. Except for cross fingerings, Veillon also uses harmonics as alternatives to standard fingerings: “In order to create a special sound, I use sometimes a mix of octave and harmonics using completely different fingerings to create a blast, which to me means binioù/bombard.”

O’Grada’s first flute (FL OG 1) had keys, they were not working and he explains that, due to the tonality of the repertoire that he plays, keys are not necessarily required: “You know if someone said, ‘I will take all the keys of your flute’, I would say ‘okay’. It wouldn't bother me too much. For most of the tunes, I don't need keys, you know.” When he had to play an occasional note, outside of the scale of D major he used cross fingerings. He exemplifies by playing a tune containing the note G# [23/234]. He could not play F natural using cross fingering [234/24] since the holes on that flute were too big. Instead he would use a technique of half holing [234/2(3)]. He finds both cross fingerings and half holing to work best in slow tunes, where he has time to optimise the sound, through adjusting the embouchure.

When Roussel began to study Swedish traditional music, she quickly encountered the, sometimes very noticeable, deviations from the equal tempered scale favoured by some musicians. The most frequent adjustments that she had to make were accessible by alternative fingerings. Sharpening the minor third in D minor (a common key in Swedish traditional music) is possible by operating both the short and the long F key at once [2345b/234a]. She also tilts the flute slightly forward, thus blowing more across the hole and sharpening the tone further. To sharpen the seventh in the scale of D minor, she uses the following fingering [3/0]. This fingering is also used when she wants to sharpen the third in A minor. To flatten the third in D major, she uses the old fingering for F natural [234/24]. As mentioned above, on flutes with large holes this fingering is not deemed as useful for producing F natural. However, for Roussel, this fingering is useful in order to produce a slightly flat F#.

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33 On his present flute [FL VE 4] Veillon needs to open also the short F key in order for this fingering to work [23/234a].

34 Harmonics are produced through manipulating the angle and/or the velocity of the air stream. The first harmonic is the octave, the second a fifth above that, the third is another fourth above.
Before she moved back to Brittany, Roussel had a large repertoire of similar alternative fingerings in order to be able to produce the desired pitch. During the interview she tries to find more examples, but being out of musical context, she finds it hard to recall the fingerings. At one occasion she remembers a tune, in which she incorporated some other alternative fingerings. Through searching for the melody while playing, she finally remembers the fingerings used. She used these alternative fingerings to some degree in her work with the ensemble, Skaran, although the use of them was limited because of the (relatively) fixed intonation of the nyckelharpa.

5.4. Modifying the flute

The topic of modifying the flute surfaces in several of the interviews. Some of the musicians have made significant changes to their instrument, while others have not made any at all. Modifications include enlarging holes, adding keys, and switching parts. Before I present the modifications made, I will address the rather complex reasons why some of the musicians hesitate to make any modifications themselves (or even to have a professional repairman make them), even if they are not fully satisfied with their instruments. First, all of the musicians show great respect for the deep knowledge that is needed to fully understand the consequences of any modifications made. Furthermore, there is a general idea that the instruments are compromises, especially with regards to tuning. Enlarging one hole in order to sharpen the pitch of one note, will also affect the tuning of other notes as well. Since it is hard to actually see the inside of the flute and its undercutting, the success of any modification is left up to a certain degree of chance. Beznosiuk addresses the issue, saying: “I wouldn’t dare. If you change something, you will probably pay for it somewhere else.” O’Grada reasons along the same lines: “I wouldn't have the knowledge. Because you know, the undercutting in these holes is dependent on the angle of the undercutting of the embouchure. I don't know enough of how that works.” Roussel tells the story of a friend who tried to improve the tuning of his flute and “now it’s wildly out of tune”. There is also an idea that the older flutes have a value, not directly related to the playability. This is reflected in Ralsgård's reaction when he received the flute made of Wahl (FL RA 4), after a woodwind repairer had replaced a spring underneath the G#/Ab key. As may be obvious to the reader, Ralsgård is the musician in the study who has been most eager to improve his flutes himself. However, in this case, the repairer had not only replaced the spring but also installed a pin, which would facilitate an easier way to change the spring in the future (Figure 28).

35 Undercutting refers to the shape of the hole from the perspective of the bore (the inside of the flute).
This pin does not change the playing quality of the flute, and the visual effect is minimal (compared to the modifications made by Ralsgård on his other flutes (FL RA 1 and FL RA 2). However, Ralsgård reacted negatively to this modification despite its limited visual impact. To him, there is a value in this flute (FL RA 4) that the flutes that he has modified himself do not have. This value is connected to the uniqueness of this particular flute and of its perceived quality. Ralsgård refers to the German flutes as mass-produced and of lesser quality. As mentioned above, German flutes are relatively easy to find second hand in Sweden, and often cheap. In line with this lies Beznosiuk’s comment on the repair made on her original Drouet flute. The G# key was broken and, satisfied with the delicate repair work, she points out that “it is exactly like it was before”. She also complains about the springs on the original Grenser flute. These springs are original and she does not want to change them even though “they are a bit sluggish and slow”. Beznosiuk is also hesitant to carry out repair work because if it is a flute of good quality, the maker would probably have made the best possible instrument. Her Rudall & Rose (FL BE 1) provides a good example of this point. With this flute, Beznosiuk complains that it is too flat in the bottom register, due to the extra low B key. She does not, however, want to modify this, since it is a high quality original 19th century instrument. On the question of whether she would try to modify it if it was a copy and thus lacking the value of an original instrument she answers: “In theory yes. If I had a copy of this and I wanted it to work as a Mercedes, then yes I would, but I would assume that the maker already would have gone that path.”
There are three reasons why the musicians in the study hesitate to improve their instruments themselves: (i) they do not want to risk making it worse due to lack of knowledge; (ii) there is a value in (some of) the flutes which is not only about the playing quality but rather about keeping the flute in its original condition; and (iii) simple-system flutes are compromises and even a good flute inevitably has its drawbacks.

5.4.1. Improving the tuning

While Ralsgård left the modifications of the key mechanism to a professional woodwind repairer, he modified the tuning of the flute himself by altering the size of the finger holes (FL RA 1 and FL RA 2). This division of labour, he explains, is due to the individual blowing technique and anatomic disposition of the player. It is also a process of gradually widening a hole and simultaneously assessing these modifications by playing and testing. These circumstances make it hard for someone else to do changes to improve the tuning, at least without a very close collaboration during the process. One note that Ralsgård perceived as particularly flat on FL RA 2 was the F# (in the first two octaves). He considers this note as particularly important since it is the third in the scale of D major, a key that is very much used in Swedish traditional music. The fifth finger hole was thus widened to bring the F# into tune (see Figure 29).

As soon as Veillon received his first flute (FL VE 1) he discovered that it was lower in pitch than the instruments around him. In order to use the flute in ensemble playing he had to retune it. As this was early in his career and well before any of the flute makers in Brittany had commenced their work, he had no one to seek help from. Thus, he found himself in a process that he describes as one of “trial and error”. This process of trial and error led him to ruin his flute but cutting the foot piece too short. To counter act this he had to retune each note by enlarging the holes.

The flute was too flat [i.e. tuned lower than A=440]. So being very impatient, and not very clever, I thought that if I reduce the column of air, it will be sharper so … (Veillon makes a sawing gesture and sound) I cut it with a saw. Not very well by the way. [Then] I realized that it was completely out of tune, so I panicked, and I retuned it with a knife.

He says that the flute was in bad condition when he first got it, but adds that “it was even worse after [he] sawed it”.

It is also possible to flatten a note by decreasing the size of the hole that produces the out of tune note. Roussel shows me her Eb-flute, where this has been done to the second finger hole in order to flatten the note of B. Ralsgård has also decreased the size of the sixth finger hole on his (FL RA 2). This had to be done
since he had first enlarged the holes too much in order to sharpen the notes. To slightly flatten the note again he put wax around the edges inside the hole. At the same time, this process allowed him to move the centre of hole slightly towards his own body. This was ergonomically preferable since it became easier for him to cover the, now relatively large, fifth finger hole (Figure 29).

![Figure 29](image)
The picture shows the enlarged fifth finger hole as well as the smaller (and slightly relocated) sixth finger hole on FL RA 2.

5.4.2. Adding and changing keys

Keys are added and changed in order to: (i) be able to play a note which otherwise is impossible or hard to play; (ii) providing another way to play a certain note; and to (iii) improve the usage of a certain key.

Veillon gives an example of how a short F key was installed on his keyless Du Ve flute. The work was done by a member of his band, Kornog. He chose to add an F key because it was the most useful, as Veillon needed “to play in D minor, to play lots of things, you know. And it was also aimed towards the repertoire that we played with Kornog.” Also, the spare key happened to be a short F key from an original Rudall & Rose flute:

> There was a strange man, a gardener with a passion for flutes. He had flutes, so he gave me a key. Jamie McMenemy carved squares into the flute and inserted blocks of Blackwood. Perfectly done, and it never moved. And he had only one spare key. (Veillon)

Ralsgård has had an instrument repairer add keys in order to have more alternative fingering for some notes. In order to play Bb with fingering [23/2b] instead of [1a23/], he has added a second touch for the Bb key on RA FL 1. He considers this to improve the balance of the flute as this means that he avoids the necessity to use the left hand thumb when playing Bb. He was inspired to this solution due to his
background in playing the saxophone, an instrument where Bb can be produced using the same fingering (Figure 30).

![Figure 30](image)

*Figure 30*
The extra Bb touch on FL RA 1

On FL RA 2 he also added another key in order to play the note G# with fingering [1b234/], instead of [2345a/] (Figure 31).

![Figure 31](image)

*Figure 31*
The added G# key is the one with a narrow touch. The photo also shows the extended touch of the Bb key [FL RA 2].

This key facilitates the playing of the successive notes of D-F-Ab, sometimes occurring in traditional Swedish tunes. He exemplifies with the tune below (Figure 32):
Interestingly, the added G# key does require the use of left hand thumb, which Ralsgård sought to avoid by adding a second touch to the Bb key on the other flute [FL RA 1]. However, the uncomfortable use of the left-hand thumb is still preferable to the very fast sideways movements required to play D-F-Ab in bar 10 and 12, that follows from using the standard fingering [34/234] to [234/234a] or [2345b/23] to [2345a]. This is the same fingering problem that Beznosiuk solved through the use of a cross fingered F2 (see the discussion on this topic in 5.3.7). Ralsgård was inspired to this solution after seeing an old Viennese simple-system flute with a key for G#/Ab operated by the left-hand thumb.

The ergonomic aspect of the key setup is only commented upon when it is not satisfying. For example, Beznosiuk complains about the placement of the G# key on her original Rudall & Rose flute (FL BE 1). She explains that a frequent use of that particular key (for example when playing a G – G# trill) gives her pain. As this is an original flute, Beznosiuk is not going to change the arrangement of the keys. However, there are ergonomic reasons for Ralsgård to extend some keys on his German flutes. Figure 31 shows the extended Bb key on FL RA 2 and Figure 33 shows the extended C2 key on the same flute.
The C2 key was extended in order for Ralsgård to play the successive notes B1-C2-D2, using the key [2/2a] instead of a cross fingered alternative (such as [34/]). He preferred the sound of the note produced by using the key. However, the idea did not work out in the end since the right hand had to be repositioned in order to use the C2 key while not touching the Bb key, which after a while brought him pain. As is visible in Figure 33, the extension of the C2 key brings it very close to the touch of the Bb key.

5.4.3. Switching parts

Veillon, O’Grada and Ralsgård have (or previously had) flutes that consist of combinations of parts from different flutes. O’Grada’s Rudall & Rose flute (FL OG 1) had a head piece from a Fentum flute when he got it. O’Grada’s current flute is also a combination of two flutes – his previous flute made by Hamilton (head piece and barrel) and a newer flute from the same maker (middle piece and foot piece). His previous flute was made of cocus wood and he kept the head piece and barrel from the previous flute since: “blackwood is clearer, but cocus wood is slightly warmer in sound.”

While experimenting with the German flutes (FL RA 1 and FL RA 2), Ralsgård tried several combinations of different head pieces and middle pieces, some of which worked better than others. If the physical fit was reasonably correct, the joint was tightened further by adding thread. The following quote regarding FL RA 1 provides an insight to what the process was like:

I bought this flute from a friend, or rather, the foot joint comes from that flute. Because eventually this joint [between upper and lower middle piece] cracked, and then I took the middle parts from a flute that I got from an old man in Värmland [a county in the mid-west of Sweden]. And I replaced the head piece also. But where did I get that from? Oh, yes, I bought it from a jeweller who used it as decoration in his storefront. And that head piece was great. (Ralsgård)
Veillon tells an interesting story about when the head piece of his Du Ve flute (FL VE 2) was replaced by a head piece made by Hamilton:

> It was sort of a mistake. The flute was incredibly loud. I don't know how Hammy [Hamilton] did it, and I don't know if he meant it, but the flute sounded, ‘boom’. I was blowing hard too. But the scale was weird. The A-note was very flat. But it was so loud. I don't think I have ever heard anything else that loud. And it was impossible to play it softly. It became truly depressing after a while. (Veillon)

This is an example of where an introduced part completely changes the nature of the instrument.

### 5.5. Other changes to the flute

While makers, woodwind repairers and players may deliberately modify the instrument, changes also occur due to the fact that the flutes are played on, or to the fact that they are not being played on for some time. All of the flutes in this study are made of wood.

#### 5.5.1. “Breaking in” a new flute

For a period of time when a wooden simple-system flute is new, the instrument often goes through some dramatic changes. The player is often recommended to be careful and to play the flute for only short amount of time every day. Veillon is the musician in the study that comments on this the most. During his career he has played numerous flutes, many of which he ordered and received directly from makers. Since he established the collaboration with flute maker Stéphane Morvan, he has received new flutes on a regular basis. By the time of writing, Veillon is breaking in a new flute, which he claims will be his last. He estimates that it takes about two years to break in a flute. One aspect that he notes will be potentially difficult during this time is intonation: “Well, I would tend to think that these problems mostly occurs with flutes that I have played [for] less than two years. After two years it starts to be much more stable and easier in my opinion.”

#### 5.5.2. Cracks

All of the interviewed musicians mention the problem of flutes cracking. This problem affects how they handle their flutes in different ways. As mentioned above, cracks were the main reason for O’Grada to change flute when he begun to travel more extensively. And cracks led Ralsgård to search for new middle parts
for FL RA 1. Beznosiuk speaks about a rather dramatic incident when her original Grenser flute cracked:

I have an original Grenser. It’s lovely. I have used it in concert, but once it cracked, thankfully just on the surface and not right through. It was due to the strong stage lights. I was playing the Eroica symphony at the time and was probably blowing quite strongly as one needs to when playing Beethoven. Ever since I have only used that flute for chamber music. The crack is still there – it opens a little on playing and then closes up afterwards. I think of it as a little valve in a living instrument. Luckily the crack didn’t go all the way through so it doesn’t actually affect the sound. But I would never play it in an orchestral, or TV situation again… and I have other modern copies which I can use instead. (Beznosiuk)

There is also a small crack in the head joint of on her original Rudall & Rose (FL BE 1). She points at it, saying that she has been playing the flute for the last couple of weeks, and that she will “probably give it a holiday”, to avoid making it worse. It opens and closes according to periods of playing, but the metal lining of the head joint means that the opening crack doesn’t affect the tone quality. Before Veillon received his Du Ve flute (FL VE 2), his Holzapfel (FL VE 1) was falling apart:

This flute had become so much a wreck. So many cracks. So when I played at the Fest Noz, the cracks were opening up and I was losing all my air. I had to take a piece of cloth and plumbing rings, you know.

In this way cracks and the risk of cracking affect how the musicians travel with their instruments, in what performance contexts they use their instruments and how much they allow themselves to play a certain flute.

5.5.3. Other problems

There are also other problems, some of which relate to whether the flute is being played regularly or not. During the interview Roussel picks up her Eb flute (FL RO 2), which she rarely plays. When she picks it up from the box, some of the metal rings at the end of each part fall off. She explains that when the flute is not being played, the wood dries up and shrinks, which cause the rings to fall off. This has also happened to Ralsgård’s flute made by Baubet (FL RA 3), as is visible on the image below (Figure 34).

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36 A Breton dance and music event.
Roussel also highlights the need to maintain the flute by swabbing (drying) the inside of the flute after each use, as well as oiling the flute on a regular basis. She complains that she is not doing this enough herself and that this misuse causes problems.

As is visible in Figure 10 (Chapter 4), Beznosiuk’s Thibouville flute (FL BE 2) is significantly bent. This is a well-known phenomenon that can happen to wooden flutes over time. Beznosiuk has never experienced any problems from this.

5.6. Perceiving possibilities in the repertoire

The interviews were all situated in the musical context of each musician. References to tunes, composers and passages were frequent and essential in explanations of playing technique and properties of the instrument. In this section, I will present statements that highlight the interplay between the repertoire and flute playing.

In a discussion about her transition from Breton to Swedish traditional music, Roussel comments on, what she considers to be, fundamental features of the music. These features have strong impact on what she can and will do when she is playing the flute.

The Breton tunes are like small boxes. There’s not a big range, and only short melodic motifs. So variations and ornamentation becomes important. The Swedish tunes have longer melodic phrases and spans a wider tonal range. This opens up other dynamic possibilities, and I have played around with that and I find it really enjoyable. I have found something in Swedish music. I can say something with Swedish music that I don’t feel I can with Breton music. I can say so much more. (Roussel)
The artistic freedom she experiences while playing Swedish traditional music is thus connected to her perceiving of possibilities in the repertoire and the ability to elaborate on these.

Veillon also comments on these structural features of the repertoire, but refers also to the context in which the music is performed: “There are things in the playing that are obvious and I think that anyone in my place would have done certain things, because there are some constant things in dance music.” Parameters such as range, musical structures and performance context are considered as a fundamental for the individual space for interpretation. Veillon explains:

You have also the personality of each one [flutists]. Some will use more staccato or tonguing, some will chop the air column more, some people less. But in all cases you have to accentuate where it must be in Breton dances. When you adapt a tune from the vocal repertoire or from the tradition of other instruments, you have to do the right accentuations. (Veillon)

Veillon considers these interpretative choices to be based on what possibilities you perceive in the music: “Other musicians hear things that you don't hear. And you hear things that – or you dream of things – that they aren’t necessarily concerned with or attracted to.” Talking from the perspective of Irish traditional music, O'Grada also comments on the essential part of listening and exploring the relation between stylistic elements and technical aspects of playing: “It’s all part of learning how to play – being able to hear all the things they [other flute players] are doing, and then work back into the technical stuff, how to achieve the effects and then work from there”. O'Grada further elaborates on how the personal perception of a tune is the departure point for working on an interpretation of that tune:

If I like a tune, there must be something in that tune I like, some pattern or whatever it is. So how can I make that thing more obvious? How can I make sure that other people can see what I like? And that's how I play it. And different people see different things, I suppose Irish music is fairly simple melodically. And that is one of its challenges. So you play a tune for the second time and those sitting in the audience already recognize it, so now they can relate to it and they can engage with it. And that is was it's about, you know. So it's not like Rachmaninow where the audience says ‘wow’ from start to finish. They are already part of it from the second time through. And the audience can relax too. […] I think that if you can make repetition fascinating, you have achieved something. (O'Grada)

The above statements connect the personal perception of the repertoire, the identification of aesthetically favourable aspects in this material, and the technical abilities used to convey these to listeners.
5.7. Le Hout and descriptions of sound

Sound is frequently referred to during the interviews. This is hardly surprising as the interviews concerned musical practice, and sound is a prerequisite for music. In this section, I want to highlight certain interesting aspects of the sound related statements. The notion of “Le Hout”, that surfaced during the interview with Veillon provides an insight to the collaboration between Veillon and Morvan:

eoretical framework.

Stéphane [Morvan] often mentioned this – it means nothing in French – ‘Le Hout’. Stéphane is a big fan of Matt Molloy, his music and his sound - and the Pratten [model]. Stéphane made some good Rudalls but he wanted the sound of Matt Molloy on certain recordings. But you know he goes through microphones, so it’s Matt Molloy, but some microphones magnify the sound a little bit. But Stéphane [Morvan] was absolutely in love with the sound on certain recordings. ‘Le Hout’ is a depth in the Pratten that Matt has. Because he has sort of, you cannot say that it is a released embouchure really, but he has this embouchure, I don't know how he does it. It’s reedy at the same time, and there is this thing behind the tone and this is what he refers by ‘Le Hout’. And we listened sometimes to Matt together. And going: ‘There it was! Yes, exactly!’ So he wanted that. And I kept telling him: ‘it’s not only the flute, Stéphane, It’s Matt Molloy.’ But anyway, he thought that he could get close enough to that.37 (Veillon)

The search for Le Hout addresses a recurring theme emerging during the interviews – whether the sound that is produced is a quality of the player or of the flute.

Le Hout has been central in Morvan’s progression as a flute maker. His motivation for developing new models (FL RO 1, FL MO 1, and FL VE 4) has been fuelled by this vision of sound. However, Morvan also contributes a great deal of the sound to the musician playing the flute. Sometimes it is hard to explain to a customer that expects his or her new flute to sound like a certain famous musician playing one of Morvan’s flutes. However, as a maker, he still needs to consider the acoustic qualities of the flute itself. In order to do this he plays and records notes on the flute while restraining from adjusting his embouchure or the cavity of the mouth. Striving to approach the flute from this neutral perspective, he tries to come close to the inherent sound qualities of the flutes.

If the physical properties of the flute are one parameter in the production of sound, the flute player is the other. As formulated by Veillon: “But the tone of the

37 The interview with Morvan ended with the two of us playing a few tunes together. Since I am familiar with the music of Matt Molloy, and Morvan had talked about his sound during the interview, we played a couple of tunes from Molloy’s recordings. When we played, I had the opportunity to listen to Morvan’s own sound and I could clearly hear the influence of Molloy in his playing.
flute … it can’t be only the flute. This is maybe where it is the most personal, maybe even more than fingerung.” One aspect that is thought to explain the highly personal dimension in the sound is the anatomy of the musician. In the discussions on the modifications made on his German flutes (FL RA 1 and FL RA 2), Ralsgård says: “Maybe someone with a different jaw wouldn’t have the need to modify it”. Veillon comments in a similar way: “Maybe the palette … it is all different with the teeth and tongue … everything is different. It’s almost physical.” However, there are also physical aspects of the musician that are not as static as the structure of the jaw. O’Grada highlights the evasive character of sound production: “Maybe it’s in your mood as well. Maybe you got a cold one day, and it sounds terrible, and another day it sounds great.” This is in line with Roussel’s description of the loss of control of the embouchure that follows from not playing the flute for a while: “The first thing you lose is your mouth. And the air is all over.”

Also, the inner vision of sound is referred to. In Veillon’s words: “it's the way you negotiated your embouchure, the way you set your embouchure to play. And probably, what you are aiming at when you play, without knowing.” Beznosiuk makes a similar comment when she discusses the sound produced: “Well, you see, part of it [the sound] is me. Not just me, but that’s the sound I have in my head. The sound I want to create.” For O’Grada the influence of the player is dominant, provided that it is a good flute: “Most of it comes from how you actually blow it. So it's about what you seek, and you will get that in most flutes, [if they are] good flutes.”

The quote about “Le Hout” in the beginning of this section involves yet another parameter, beyond the musician and the flute – the microphone. The importance of the microphone and sound engineer is stressed by Veillon: “If the sound is bad upfront [on the stage], there is nothing you can do. For this type of music, it is important, and it doesn’t just come with the jack. We depend on the sound man.” He goes on to talk about the possibilities of well produced sound at a live performance:

To me the ideal thing is [that] I hear myself correctly, and I hear the others. But I hear myself in the hall, because you will play with the hall. And you hear your flute on stage and also in the hall, it is like inside and outside, here and there, in some sort of way. Then you can tend to play away from the microphone because you are comfortable and you are a little bit away from [the] microphone. Better tone, wider tone. It helps for nuance. It’s what happened with Barzaz the other day in Paris. At first I didn't hear the hall. I thought it was a weird hall, but when the concert started, then I detected my sound in the hall, my outside flute, and then I gradually started to play less close to the mike and it was great. At some solo parts I was almost playing away from the microphone, as if I wanted to mix my direct sound on stage with the reflected sound out in the hall. I love that. (Veillon)
The acoustic environment also stands in relation to particular flutes. Beznosiuk comments on this when she is talking about the qualities of her French Thibouville flute (FL BE 2) (see 5.2.5). Veillon makes a similar comment regarding a flute that he owned and played for just a short period of time:

“I recorded in the Duke’s hall, in an old manor. It was a stormy day and I did an introduction. It’s really interesting, for some reason, the sustain I had ... it was easier to play it on that particular flute. I remember that occasion for sure.”
(Veillon)

As is obvious from these examples, the discussion of the sound as a feature of the flute or of the player is never a matter of being able to eliminate one or the other. But it is rather a discussion about the relation between the two. Furthermore, the acoustic environment emerges as a third influencing parameter, highlighting the qualities of sound projection of the musician/musical instrument combination.

5.8. Exploration

According to the interviewed musicians, flutes often get better the more you play them. However, Ralsgård also comments on a particular flute that did not change. He describes this as a disadvantage: “You want to have a flute that grows as you play it.” He is aware of the subjective character of such a judgement and it is not explicit whether he refers to an actual change of the flute itself or the possibility to discover more nuances in its already existing possibilities. It is seen rather as a combination of the two aspects and not necessary desirable (or even possible) to make a distinction between them.

The subjective experience of playing a flute is also reflected in Roussel’s reasoning about the possibilities of switching to another flute. She has played her current flute (FL RO 1) for so long (since 2005) that it would be hard for her to change: “It takes time to adjust to a new flute. I would have to play one of those [referring to my own Morvan flute of the third model] for several months, only to form an opinion.” This is in line with what Veillon experienced when he transferred from his Du Ve flute (FL VE 2) to the Rudall & Rose type flute made by Wilkes (FL VE 3) (see 5.3.1). The fact that you adapt and get used to a flute is also central to Morvan’s decision not to maintain more than one model in parallel production, while many other flute makers have two or more flute models available through ordering. To Morvan it is essential to adjust his own playing to the current model and for him it is impossible to play more than one model properly.

As mentioned in 5.1.4, when O’Grada assists Hamilton with opinions on his flute designs, he estimates his input to be very limited. The input he does offer
concerns details: “You will notice it alright as an experienced player, but if you weren't as an experienced player, you wouldn’t be able to tell the difference.” According to this statement, the ability to perceive the details of possibilities is not only linked to the individual experience of a particular flute, but the level of experience as a flute player in general.

This subjective experience of playing the flute is linked to the process of exploration. O’Grada comments on the necessity for students to sometimes “work things out themselves.” This is particularly true with aspects that are hard to explain verbally, such as embouchure position and how to work with the cavity of the mouth: “I usually try to go through the sound. Because it is almost impossible to describe how to form an embouchure.” This is not only because of the extreme level of detail that is required in such an explanation but also because of the individual variations of anatomy (i.e. to produce a certain sound may require different approach from one player to another). This way of encouraging the student to listen and adapt to the possibilities of the interaction with the flute is also a teaching strategy used by Beznosiuk:

I teach modern flute players [i.e. playing Boehm’s cylinder flute] at the Royal Academy of Music. I have several fantastic students, they win prizes and they get jobs in symphony orchestras. But they like studying this [kind of flute], because it is interesting to learn about earlier style instruments and because it has something to teach them about the music itself. It challenges their expectations and preconceived ideas about flutes and music. When they try to play these flutes, I have to tell them to stop trying to make it ‘work’, that is, in the way which their modern flutes work … quickly, easily and efficiently. They use their well-developed modern techniques to try to make the flutes do something. But as soon as they stop doing it this way, let go of perceived assumptions and start listening and responding to the instrument, it starts to work properly. The flute is showing the way, the flute is the teacher. Flexibility and an open mind and ear are essential. (Beznosiuk)

The process of exploration has been central to Veillon as he is self-taught. In the following quote he elaborates on the difference between discovering and being taught:

The fact that I never was taught by anyone means that I discovered everything which resulted in the fact that I had to experiment and discover by myself – sometimes I was thrilled, I thought I had discovered a totally new thing, and then I realised that it was a very well-known thing, like the harmonics. […] So it’s a slow process, but what you discover yourself – I have this feeling – it creates what you are also. Because then when I was teaching in a workshop, after a workshop of four hours I had told them things that took me twenty years to discover. And I am always wondering, how will they use it? Because at the workshops, people often ask me: “on that recording, on that tune – how did you do it?” And I show them and then I will give them options. “You could do this or that.” But what I cannot show them or teach them is the time it took me to make it properly. (Veillon)
The above statements show that the subjective experience of the interaction with the flute is a central aspect in the process of developing as a flute player.

5.9. Summary

In this chapter, I have presented the analysis of the interviews. A number of themes are explored through statements departing from the flutes. The availability of flutes has changed during the course of the musicians’ careers. This topic reflects both the individual path as well as the different contexts that they are situated in. Among other things, this reveals whether the modern made versions of the simple-system flutes are preferable to original 19th century instruments. Playing a modern made flute potentially provides a possibility to collaborate with flute makers during the design process. However, this collaboration can be more or less productive depending on the openness from both parts. The topic of flute models reveals the great variety of instruments that are referred to as simple-system flutes, as well as different preferences and approaches regarding those models. Statements on playing technique reveal both similarities and differences between the interviewed musicians’ approach to their instruments. The idea of the simple-system flute as a compromise is present in all interviews, although the ways that the musicians cope with this compromise is different. Ralsgård, in particular, modifies some of his instruments in order to facilitate new technical possibilities. Modification is unthinkable for other musicians in the study, due to the risk of ruining the flute. This aversion to modification is also linked to the history and quality of the flute itself. In all circumstances, the flutes are seen as sensitive objects, always changing depending on how they are used and maintained. The changing, and even evasive nature of the flutes, enhances the subjective experience of the interaction between the flutist and the flute. This experience leads to an exploratory approach towards the instruments. In the following chapter, I present the categories of affordances that emerged in the analysis of the results presented here. In Chapter 7, I will discuss the results through the perspective of the theoretical framework presented in Chapter 3.
6. Results 2: Categories of affordances

In this succeeding result chapter the second research question – *how can these approaches and possibilities [of the simple-system flute] be understood in terms of affordances?* – will be addressed. In the analysis of the interviews, the following categories of affordances emerged: (i) affordances of the column of air, (ii) affordances of sound, (iii) affordances of fingering, and (iv) affordances of the repertoire. These are to be considered as fundamental categories of affordances and will be further discussed in Chapter 7. The effectivities referred to are based on the operational definition presented in 3.4: *everything that informs the subject’s relationship to the musical instrument, and hence defines the affordances in this relationship.* The first three categories of affordances are relations between the musicians’ effectivities and the simple-system flute (Figure 35).

![Figure 35](image)

Affordances oscillating between the effectivities of the musician and the musical instrument

6.1. Affordances of the column of air

The statements of the interviewed musicians describe an inseparable relationship between the idiosyncrasies of a particular flute and the musicians’ body, playing technique and stylistic preferences. Veillon defines the column of air as extending from the diaphragm to the end of the flute. As such, it literally bridges the division
between the body of the musician and the flute. Furthermore, it exists only when the musician is playing the flute.

Veillon refers to the column of air when he talks about the various ways it can be interrupted (i.e. articulation techniques). This “blue sausage” is an encompassing framework for understanding articulation and as the interviews indicate, an individual flute player tends to use some of these techniques more frequently while omitting some altogether. Roussel, who considers the glottal stop to be too imprecise, and O’Grada, who does not use the tongue at all, exemplify the diversity in approaches.

Veillon and O’Grada clearly have different approaches regarding management of air. While Veillon discusses how to keep a note in tune while running out of air, O’Grada’s advice is to keep enough air in the lungs, in order to “be strong all the time”. This different perception of the affordances of the column of air clearly reflects aspects of their musical ideal.

As pointed out on several occasions during the interview, some flutes require different approaches regarding the volume and the pressure of air from the player. As stated by Beznosiuk, adjustments of the air are also required for different notes. One of the most striking examples of this is when Veillon describes how the demands for a sensitive approach towards the column of air, when playing his Wilkes flute (FL VE 3), made his whole aesthetics change. This is to be juxtaposed with Veillon’s comment about his Du Ve flute (FL VE 2), which he found impossible to play softly. As Ralsgård highlights, a certain flute also responds to articulation in different ways on different notes, depending on the register.

The altering character of the affordances of the column of air is even more clear in O’Grada’s comment on parameters that may impact the capacity of the player, for example having a cold. Roussel adds to this the condition of the embouchure; if she has not played the flute for a couple of days, she cannot focus her airstream, in her words she “loses air”. While the feature and properties of the flute lead to adjustments by the musician, a certain playing style may give rise a certain set of demands on the flute. This is obvious from the examples of modifications presented in the previous chapter. The approach to the column of air is one of the main parameters of playing style that Morvan considered when he started to develop his current flute design (i.e. if a player blows “hard” or “soft”).

The above summary of statements implies that so much of the action performed by the musician is dependent on the particular choice of instrument that the column of air emerges as a one complete unit. It can thus be viewed as a category of affordances as defined above.
6.2. Affordances of sound

The sound produced when a musician is playing the flute is perhaps the most obvious example of affordances. It is a direct result of the interaction between the flute and the flutist, and the existence of sound is literally depending on both. Even when Morvan wants to examine the acoustic properties of the instrument itself, he still needs to blow into the flute, thus creating the sound himself. The statements of the interviewed musicians about sound quality and characteristics can be viewed as positioned along the continuum below (Figure 36); from ascribing the quality of the sound to the player to lengthy discussions about the sound of different flutes. Examples of adjectives used in order to describe the sound include: veiled, shiny, round, lustrous, homogenous.

![Figure 36](Continuum of statements regarding the root of the sound quality.)

The player affects (and effects) the sound through the embouchure and blowing technique, but also the physical properties of the jaw and the cavity of the mouth. Comments on this side of the continuum are presented in the previous chapter and include for example “you chase the sound you want and that's what you get” (O’Grada) and “that’s the sound I have in my head” (Beznosiuk). On the other end of the continuum are statements from the lengthy discussions about the sound of different flutes. The features and properties of the flute said to be influencing its sound are the wideness of the bore, the size of the holes, the type of wood, and history of its use.

Designing his third model (FL VE 4), Morvan strived to combine certain features from his previous models (a Rudall & Rose type flute and a Pratten type flute). His intention with the design is, among other things, to create a flute with a moderate consumption of air but still with wide dynamic range. He wants the flute to have flexibility in sound, and to offer Le Hout, in particular. However, since some customers are not able to bring out a satisfying sound, Morvan’s flutes do not automatically afford the sound of Le Hout to anyone. The musician aiming for that sound must also have the capability to produce it. Viewing Le Hout as an affordance of Morvan’s third model would not do justice to the complexity of the
act of playing an instrument. However, viewing Le Hout as an affordance of the sound, possible to act upon due to the features and properties of the instrument and the capabilities of the musician (effectivities), opens up a path for an exploration on the correspondence between these two poles. Ralsgård’s modifications to his German flutes (RA FL 1 and RA FL 2) are also partly motivated by the desire to change the affordances of sound.

O’Grada highlights another interesting aspect of affordances of sound. When he teaches he rarely provides detailed descriptions on how to form an embouchure. Instead he demonstrates what a good sound might be and the student then tries to recreate that sound. In this way, the sound is specifying the adjustments needed. Given that the student has the ability to pick up the information and adjust his or her embouchure accordingly, the sound affords changes in the effectivities of the musician.

The acoustics are also subject of several statements. The sound of the flute transfers differently in different venues and is affected by microphones and sound technique. According to statements by Beznosiuk and Veillon some flutes fit better than others in some acoustic environments.

6.3. Affordances of fingering

The possibilities for alternative fingerings exist partly depending on the features and properties of the flute. Certain fingerings are available to the player, who knows both the fingering, but also has the blowing technique needed to “make them in tune” – in Beznosiuk’s words – or “optimise them”, as O’Grada phrased it. When Veillon demonstrates his solutions for playing Bb without the use of keys, not only is the alternative fingerings produced by a specific embouchure, but also a tilting of the head. The alternative fingerings require more from the player far beyond a particular finger combination. As mentioned above, these fingerings might have been thought of by the maker, and perhaps even documented by someone like Fürstenau. However, a musician may also discover new fingerings through exploration. These fingerings each have their own potentials of timbre, volume and intonation. Thus, it is possible to talk about the affordances of each fingering combination as well as its character, which depends on both the flute and the player. One example of this is the affordance of the cross fingering for F (234/24). When Beznosiuk is playing her Thibouville flute (FL BE 2), this fingering affords Beznosiuk the production of F natural (providing the solution to the problem of D-F-Ab). However, for Roussel, while playing a Rudall & Rose type flute made by Morvan (FL RO 1), the same fingering affords an intentionally flat F#, which she sometimes uses when she plays Swedish traditional music. O’Grada and Veillon bring up the technique of half holing. For Veillon, large
holes affords half holing, and O’Grada adds that, as with cross fingerings, half holing also requires the player to make adjustments to their embouchure.

These examples show how the affordances of a fingering are formed between the musician’s ability and intention (his or her effectivities), and the properties and features of a particular flute. Furthermore, the act of fingerling is a means to remember repertoire. On several occasions during the interviews, the musicians picked up their flute in order to provide a musical demonstration. Doing this, they often had to play a couple of phrases to find a suitable example. To examine the cognitive processes involved in this act is beyond the scope of this study, it is however clear that the act of fingering provides an aid when it comes to recalling and remembering the repertoire.

6.4. Affordances of the repertoire

As pointed out by Veillon and O’Grada, different musicians perceive music in different ways. Thus, the repertoire affords different possibilities for action. The connection between this perception and personal style is present in the empirical material. Adapting Breton traditional music to the simple-system flute, Veillon considers some of the interpretative aspects of his playing to be given by the repertoire. He refers to certain rhythmic aspects as constant in dance music, claiming that anyone in his situation would have made similar choices. How basic these aspects may be, it still requires some insight from the musician to pick those up and incorporate them into the playing. O’Grada provides another example on how musical structure may afford certain interpretative practices when he refers to the repetitive form found in Irish music: “If you can make repetition fascinating, you have achieved something.” He concretises this ideal when he provides examples of variation through the use of varied ornamentation.

Roussel’s fascination with the tonal range and dynamic possibilities in Swedish traditional music are to be understood with reference to her background in Breton music (describing Breton traditional tunes as being “small boxes”. She contrasts the two genres in a way that shows that her background impacts what possibilities she perceives in the Swedish traditional music. Thus, her background, taken as effectivities, stands in relation to the features of the music and causes her to pick up and acts on certain affordances of the repertoire.

The interaction with the musical instrument of choice also influences the affordances of the repertoire. It emerges as a frame through which the opportunities for action are concretised. O’Grada points at the necessity to be able to connect aspects that one hears in other musicians playing to the technical procedures behind this effect, in O’Grada’s words: “work back into the technical stuff.” Examples of other statements that connect interpretative aspects to playing
technique include Beznosiuk’s reflection about air management: “It’s a question of less air and changing the speed of the air and changing the volume of the air. And that is how the music works as well.”

While an original flute may provide insight to historical interpretation practice, the perceived affordances of the repertoire are also a driving force behind the development of new flute designs. Perceiving the potential affordance of a wide dynamic range in the repertoire, prompts Morvan to develop his flutes accordingly. The perception of limited tonality in Irish traditional music (as captured by O’Grada’s indifference towards the non-working keys of his original Rudall & Rose flute (FL OG 1)) requires makers to provide diatonic flutes without keys. LeHart even sells keyless flutes with the possibility to add an optional number of keys at a later stage. Depending on the musician, each new key may afford new tonalities and new ornamental possibilities.

While the affordances of the column of air, the affordances of sound and the affordances of fingering can be seen as oscillating between the flute player and the flute (Figure 35), the affordances of the repertoire can be understood as oscillating between the musician/musical instrument relationship and the repertoire (Figure 37).

![Figure 37](Image)
Affordances of the repertoire oscillating between the musician/musical instrument and the repertoire.
7. Discussion

In this chapter I will discuss the results of Chapter 5 and the categories of affordances presented in Chapter 6, in light of the theoretical perspective (Chapter 3) and the previous research (Chapter 2). I open (7.1) with a discussion targeting some of the ontological confusion surrounding the concept of affordances (as presented in Chapter 3). The empirical results of the present study might contribute to the shaping of an understanding of affordances that is relevant to the study of musical instruments. In the following discussion of the categories of affordances (7.2), some of the research presented in Chapter 2 is highlighted, especially the area of research reviewed in section 2.2.2 (musical instruments as transducers of movements). Throughout the interviews, the musicians comment on aspects that inform their position towards their instruments. Reviewing the foregoing chapters with this in mind reveals three areas that might be discussed as part of their effectivities (7.3): (i) body features, (ii) embodied habits, and (iii) musical preferences. The first area includes anatomic features and ergonomic aspects. Embodied habits are central to the developing of technical skills. According to the present study, some of these habits are hidden and become tangible in the process of change. Furthermore, the musical preferences are another point of departure in the interaction with the flute. Statements highlighting the relevance of the perception/action loop are discussed in 7.4, which is followed by a discussion on the affordances of the simple-system flute as overlapping (7.6). I also discuss the process of learning that causes the learner to become gradually more perceptive of subtler affordances, hence expanding the array of available actions (7.7). I close the chapter by revisiting some of Gibson’s (1979/1986) original formulations (7.8).

7.1. Placing affordances

I here return to one of the critical points of debate regarding the theory of affordances: whether affordances are to be understood as properties of the environment that relate to the subject, or possibilities for actions that exist in the relationship between the subject and the environment. Since the empirical material informs the understanding of this issue, and the discussion of the results must be
based on a clearly articulated point of departure, I will briefly recapitulate some fundamentals in the debate before I arrive at the definition used.

As clearly argued by Gibson (1979/1986), the concept of affordances aims to dissolve the dualistic approach between the subject and the surrounding environment. As the debate summarised in Chapter 3 shows, this can be understood in different ways. Since the underlying questions in this debate are related to a fundamental part of the theory, it is a relevant point of departure in the correspondence between the theoretical framework and the empirical results of the present study. Inspiration can be drawn from the frustrating task of defining the distinction between the musician and the musical instrument from a traditional dualistic viewpoint. As presented in 2.2.2, Kvifte (2008a) addresses this distinction. From his argumentation, it must be acknowledged that this distinction is evasive, blurred, and dependent on the situation. This is perhaps especially true for wind instruments, where so much of the sound production is dependent on the physical body of the performer. This is also brought up in several statements by the interviewed musicians. In fact, the impossible task of making a clear-cut distinction is a prompt for research such as the present study. As pointed out by Shaw and McIntyre (1974), Gibson is asking the what question and not the how question. Inspired by this, I think the concept of affordances can provide a way to address the issue discussed by Kvifte from another angle: that the distinction between the musician and the musical instrument is not of interest from a practical point of view. What is of interest, rather, are the ways that these two are inseparable. This is not to deny that there are two separate parameters in play: the musical subject and the musical object. However, from the performers point of view, the meaning is situated in between and cannot be completely captured through a dualistic approach.

The statements of the interviewed musicians are situated in this subjective relationship. At no time during the interviews are the physical features and properties of the flutes discussed without references to the musicians themselves, or the actions that they intend to perform with their instruments. And vice versa, the playing technique that they bring forth are never stated as eternal truths, but rather as approaches that depend as much on the instrument they are playing as well as the repertoire and genre they are performing.

The categories of affordances presented in Chapter 6 are defined as relationships between the musician and the musical instrument. These relationships constitute the opportunities for action. As such, affordances can be understood as oscillating between the features and properties of the musical instrument, and the effectivities of the musician, taken as everything that informs the subject’s relation to the musical instrument (Figure 38).
Affordances defined as the relationship between the musician’s effectivities and the features and properties of the musical instrument.

Following from the definition given above, it would at first seem impossible to talk about the *affordances of the simple-system flute*. Stringently following the definition, it would instead be appropriate to talk about the *affordances of the interaction between the musician and the simple-system flute*. As mentioned above, the statements from the interviewed musicians are highly subjective in nature. The musicians themselves are aware of this, and at several occasions they explicitly refer to their own subjective experience as the basis for what they express. From a practical perspective it is irrelevant whether the affordances are affordances of the musical instrument or the affordances of the interaction with the same instrument. All meaningful perception of the instrument is bound up in this relationship. In Gibson’s words: “To perceive the world is to coperceive oneself. […] The awareness of the world and of one’s complementary relations to the world are not separable.” (Gibson, 1979/1986), p. 141) As a musician, one perceives the features and properties of the musical instrument as they relate to one’s effectivities, in terms of affordances. Following from this, the wording, *the affordances of the simple-system flute*, as appears throughout the present study is still relevant, even though affordances are defined as relations constituting opportunities for action.
7.2. The categories of affordances revisited

With the categories of affordances presented in Chapter 6 in mind, I now return to the background and previous research presented in Chapter 2.

The definition of the column of air in terms of affordances presented in Chapter 6 extends the meaning of the air column as described in Oxford Companion to Music:

The body of air contained within the bore of a tubular wind instrument. Sounding a note causes the air column to vibrate; the frequency of the vibrations determines the pitch of the note heard. The acoustic properties of the air column are affected by the shape of the bore (which may be conical or cylindrical) and its length, which may be altered by the use of valves to increase or decrease tubing on brass instruments, or by the opening and closing of side holes in woodwind instruments. (Cochrane, 2011)

The affordances of the column of air can be understood as combining the air column (as described above) and the respiratory system of the musician. The properties of these are often discussed as separate entities. The air column as defined above (i.e. the air contained in the bore of a wind instrument) has long been an interest among acoustical researchers. Examples of such research are mentioned in Chapter 2 (Nederveen, 1998; Felix & Dalmont, 2012; Benade, 1960; Keefe, 1982; Backus, 1964; Coltman, 1971). With some exceptions, this body of research does not include the musician, but is more concerned with calculating the acoustic properties of the instrument itself. Although this research can be informative for an instrument designer, its relevance for practitioners may be limited. This is due not only to the fact that the research is building upon scientific calculations that demand specific knowledge to be understood, but also because – for a musician – the experience of playing music can be considered to have primacy. In a performance situation, a wind instrument is conjoint with the body of the musician; hence the air column is extended.

Discussions regarding the part of the air column situated inside the body of the musician rarely include the flute concerning the Boehm flute. Perhaps the greater standardisation of the modern Boehm flute partly eliminates the flute in the discussion on the column of air. Indeed, articles in flute periodicals rarely discuss individual musical instruments and how these affect the handling of air internally in the musician’s body (Buchman, 2013, Kara & Bulut, 2015; BastaniNezhad, 2013; Baker, 2013; O’Riordan, 2015a; 2015b; 2016). In the terminology of the present study, this can be understood as a tendency to emphasize the notion of effectivities, since the features and properties of the Boehm flute is standardised in comparison to the simple-system flute. Another example of this is a discussion on the language spoken by the musician in relation to the effects of the consonants
used in articulation. Here, some examples (Helgeson Torres, 2012; Valette, 2010) show an interest to discuss the subtle nuances of articulation without any reference to the variation in response of individual instruments. The musical instrument may however become a natural part of the equation when teaching Boehm flute players to play the piccolo, thus highlighting how the effectivities of the musician must adapt to the similar, but new instrument (Rudolph, 2009). As the present study shows, this is not the case with the simple-system flute. During the interviews, the different individual flutes are described as demanding significantly different approaches regarding the column of air. Also, the different approaches taken by the individual musicians vary. Indeed, studying the column of air in terms of affordances, it is dependent on both the flutist and the flute. The empirical material in the present study points in this direction and there are examples of research striving to bridge the gap between the musician and the musical instrument. Acoustical research combining the air column of wind instruments with the body of the musician have been conducted in order to measure the impact of the vocal tract on the sound produced. Such research has been exploring clarinets (Benade, 1986; Backus, 1985), and saxophones (Scavone, Lefebvre & da Silva, 2008). However, this research does not account for the individual differences among musicians, nor variations from one specific instrument to another. From the perspective of the present study, the research project on Boehm’s transition flute conducted by Balosso-Bardin, de la Cuadra, Vauthrin, and Fabre (2017) is of interest since it so clearly shows the significant variation in action demanded between different individual flutes. Although the study is made on Boehm’s transition flute model from 1832, the results resonate with the present study and shows that the instrument is not complete without the musician, without whom intonation is uncontrolled. The human body is needed to alter the virtual length of the sounding tube by increasing and decreasing the opening of the lips (see also Coltman, 1966; 1979 for similar studies regarding the Boehm flute). Similarly, both the musician and the flute are needed to produce the sound (at least in a traditional sense). Of interest is however to what degree the sound is considered to be a product of the qualities of the flute or the musician. As can be seen in Chapter 5 and 6, the ways to talk about this varies.

In the action/perception loop visualised in Figure 4, Windsor (2016) includes the sound as part of the loop, referred to as information/trace. The sound is a result of the interaction with the musical instrument and it is there to be perceived by the musician themself, as well as other musicians and the audience. However, not only is the sound the result of this interaction, but it in Windsor’s terms it is a trace, and as such it points in the other direction as well: “the trace of a gesture is the information that specifies a particular action” (Windsor, p. 60). This resonates with O’Grada’s comment about students adapting their technique according to a demonstrated sound – they hear a sound which itself carries information about how to adjust their embouchure and blowing technique. The affordances of the
sound described in this way resonate with Clarke (2005), saying that a sound potentially specifies objects and events, if the listener has the adequate skills to perceive it as such. In Nilsson’s (2011) words: “the system self-adjusts in order to optimize its resonance with the environment”. The same idea is formulated by Aho (2016) as: “The movements of the performer’s body are there embedded in the sound for the listener to feel. We can identify the music-producing movements we hear in the recorded sound.” (p. 22) A flute maker such as Morvan, who has other interests and perceptual skills, is able to adapt his instrument design in order to facilitate a certain sound, such as Le Hout. The same is true in the case of flute maker Patrick Olwell who is interviewed in Lochridge’s study (2004).

The statements from the interviewed musicians in the present study include examples of how the sound emerging in a certain acoustic environment impacts how they play. Influencing parameters brought up during the interviews are dependent on the performance context and include acoustic properties of the room itself, microphones/sound technique and the sound of other instruments. As Beznosiuk points out, a specific instrument might flourish in a certain acoustic environment.

The sound is also acted upon in unconscious ways. At several occasions, I have experienced physical tension when playing and teaching in rooms with very dry acoustics or recording in a completely acoustically dry music studio. Even though I try to prevent it, my body tries to compensate for the lack of acoustic response with physical force. In this way the sound can be seen as an extension of the musical instrument. The instrument is not only an output, but also impacts the musician’s actions and reactions in both conscious and unconscious ways. Parallels can be drawn to a study by Haueisen and Knösche (2001), showing strong connections between hearing familiar music and involuntary motor movements by pianists. The sensitivities are extended into the surrounding environment.

As Wettermark (2016) argues, the sound can have priority over the physical object with regards to the forming of an identity of a musical instrument. Indeed, Veillon decided to play the simple-system flute (or the Irish flute, as he thought of it at the time) when he found himself deeply fascinated by the sound of the instrument on an early Chieftains album. The sound was his first encounter with the instrument and when he later received a flute he did not even realise that it was another type of flute, since he had not even seen the instrument that he had decided to play.

The affordances of fingering are perhaps the most tangible and visual of the categories presented in Chapter 6. In his chapter on music structure and human movement, Baily (1985) argues for a revaluation of the spatiomotor mode of musical experience: that the interaction between the spatial layout of a musical instrument and the musician is, in many ways, foundational for the music produced. This view resonates with the present study. Baily further nuances his
view, stating that it is “important to stress that the constraints imposed by a particular layout are only tendencies; they do not necessarily present insurmountable difficulties” (Baily, 1985, p. 256). In fact, drawing from the results of the present study shows that the individual perception of the spatial layout of the simple-system flute seems to be significantly different on a fundamental level. To Beznosiuk, the keys of the flute are an inherent part of the instrument. She has a large repertoire of fingerings that she uses depending on the flute and the musical context - they are part of her way to think through her instrument. This can be contrasted with O’Grada’s approach to the keys as something to be used when it is necessary to produce the odd note outside the pitches found in D and G major (and their relative minors). He states he would not be bothered if someone removed the keys from his flute, since he does not really need them. Although Beznosiuk and O’Grada are using instruments with the same capacity of producing all the semitones in an octave, it could be viewed as though Beznosiuk is playing a chromatic flute, while O’Grada is playing a diatonic flute with the possibility to sharpen or flatten certain notes. This individual approach to fingering resonates with Brown (2002), who states: “it is virtually impossible to prescribe definite simple-system fingerings without hearing the flautist and knowing the flute, since information and response vary greatly” (p. 42).

As pointed out by Huron and Berec (2009) there are connections between the term idiomatic and the concept of affordances. Whereas the term idiomatic ascribes certain qualities to the instrument itself (such as certain passages of notes or timbral effects), affordances of fingering can be taken as individually constructed notions of idiometry (what one musician perceives as idiomatic may be due to particular playing techniques developed through specific exercises). This is connected to the repertoire that these musicians engage with as well as their effectivities, which inform their perception of the possibilities of their instrument. As certain patterns of movement are idiomatic, it follows that there are also patterns of movement that are harder to execute than other – if some patterns are to be seen as idiomatic, then there must be some that are non-idiomatic. This has been discussed in terms of difficulties (Huron & Berec, 2009), constrains (Mooney, 2010) and resistance (Aho, 2016). Although it makes sense to discuss this range of possibilities between what is considered easy and what is cumbersome, we should remember that Gibson’s original formulation on affordances contained both ends of the scale: “The affordances of the environment are […] either for good or ill” (1979/1986, p. 127). Just as the affordances are foundations for musical actions, the resistance is equally influential: “It is possible that particular harmonic, or melodic events arise due to idiomatic concerns, constraints, or opportunities. Detailed study of the ‘micro-structure’ of
performance difficulty might prove to be rewarding.”

(Huron & Berec, 2009, p. 120) O’Grada provides concrete insight into one such micro-structure arising from the weak timbre of the note E, which is a feature inherent to the construction of the simple-system flute (as discussed by Greene, 2012). In order to compensate for this drawback, O’Grada demonstrates the ornament that he refers to as “scraping from below”. As Aho (2016) summarises, both affordances (in a positive sense) and constrains are foundational for the playing of a musical instrument:

Musical instruments are situated in a “cognitive loop” of the human brain and the environment, in the sense that not only are their players constrained by the real or apparent limits of their instruments’ tacit usability, but they also use the instruments as aids for musical thinking and planning. (Aho, 2016, p. 32)

The real and apparent limits that are perceived in musical instruments, situated in this cognitive loop, are tied to the individual perception of the spatial layout of the simple-system flute, as exemplified by Beznosiuk’s and O’Grada’s different approaches to the keys. The variation of these perceptions among simple-system flutists is further complicated through the fact that the tactile sensations bound up with the playing of the instrument are not accompanied by any direct visual guidance. Anyone who has played a transverse flute knows that it is futile to try to see the movement of the fingers and the layout of the flute when playing (at least if the player is not facing a mirror). This contrasts with many other instruments where the visual guidance may be of uttermost value. Although the interviews of the present study do not probe in to the musicians’ inner vision of the spatial layout of the simple-system flute, it could be argued that a feature not used (such as a key) does not manifest itself in the perception of the instrument. In order not to be misunderstood, I will highlight that I am not referring to any kind of mental representation of a physical object, such as the kind that Gibson (1979/1986) sought to do away with through the theory of direct perception. It is rather the equivalent of being at home, closing the eyes and still be able to visualise the room and find one’s way to the door.

That it is not possible to be directly visually guided while playing a transverse flute amplifies the individuality of the musician’s understanding of the simple-system flute and makes the concept of affordances highly substantial in discussions regarding the interaction with the instrument. This individually organised perception of the spatial layout emerges as highly interesting when it is considered fundamental to the music that is created. As Baily (1985) states, the above-mentioned cognitive loop, binding the musician and the musical instrument together, is a point of departure for musical creativity:

38 In an article on flute teaching in the context of higher music education in relation to my own practice, I use Schippers’ (2010) notion of the atomistic approach to learning and teaching to conduct what can be viewed as such a study on micro-structure (Tullberg, 2017).
The spatiomotor mode can then be regarded as a legitimate and commonly used mode of musical thought, used to instigate and to control musical performance and just as creative as the auditory mode, for creativity in music may often consist of deliberately finding new ways to move on the instrument. (Baily, 1985, p. 257)

All of the musicians in the present study refer to processes of finding new ways to move on their instruments. Indeed, since all of them to some degree have been prompted to shape their own approach towards the repertoire of their respective tradition, this sense of creativity is evident through the discussion on ornamentation and alternative fingerings. Strictly speaking, “finding new ways to move on the instrument” may also refer to the processes of modifying the flutes, in order to create possibilities for the new ways of moving. Shaw’s (2013) study shows that the modifications constituting the “improvements” on Nicholson’s improved flutes are directly connected to certain aspects of his playing. A certain playing technique is needed in order to realise an aesthetic vision. Modifying the instrument, which in turn allows for a greater effect of the playing techniques used, further enhances this development. The same process can be seen in Ralsgård’s experiments on his German flutes (RA FL 1 and RA FL 2) where the addition of new keys and the modification of existing keys facilitates new ways of moving. This is also true regarding the long-term collaboration between Veillon and Morvan. In Mooney’s (2010) terminology, these processes aim at improving the framework of affordances that is the musical instrument.

In a performing situation the three categories of affordances of the simple-system flute – the tactile in fingerings, the aural in the sound, and the sound-producing column of air – is interwoven, through the action/perception loop, with the music that is created. As Dogantan-Dack (2015) states: “Performers do not think merely in and through sound, but in and through the instrument-cum-sound” (p. 172).

7.3. Effectivities

As summarised in the operational definition in 3.4, effectivities are referred to as every factor that informs the subject’s relationship to the musical instrument, and hence defines the affordances in this relationship. Throughout the foregoing chapter, statements are presented that highlight various parameters informing the musician’s approach towards their instruments. In this section, I will examine three aspects of effectivities that emerge from the empirical material: (i) bodily features, (ii) embodied habits and (iii) musical preferences.
Perhaps the most obvious parameter influencing the effectivities is the bodily features that one is born with and cannot alter\(^\text{39}\). There are examples of this in the empirical material of the present study. When Roussel received her very first simple-system flute, she discovered that she was, initially, unable to use it since her hands were too small to cover the open holes. Beznosiouk complains about the placement of the G\# key on her original Rudall & Rose flute (FL BE 1), Ralsgård points at the necessity of extending the C2 key in order facilitate a better usage (at least that was his plan on the outset). Furthermore, the anatomic features of the musician are thought of as having impact on tone production. Veillon comments on the palette as being one factor in the personal quality of the sound produced. Ralsgård mentions that his need to alter the tuning may, to some degree, be sprung from his own body features (i.e. the jaw).

Effectivities taken as bodily features certainly have bearing on the musicians’ approaches to their instruments. This understanding of effectivities has been used in previous research such as Warren’s (1984) experiment on staircase riser height. Although this notion of effectivities might provide some insight on how we relate to the environment depending on our body features, it does not allow the researcher to address the more complex issues of the interaction between musician and musical instrument. This approach to effectivities as a point of departure for a discussion of affordances would possibly lead to a cul-de-sac of ergonomic statements such as the above examples. However, body features and ergonomics undeniably have impact on the relationship studied here, and as such they must be taken as a fundamental part of the musician’s effectivities.

Effectivities taken as bodily features also provide an interesting parameter when it is understood against a dimension of intentionality. Beznosiouk would not have any reason to complain about the placement of the G\# key if she did not intend to use it. O’Grada did not even bother to repair the non-functional G\# key on his original Rudall & Rose flute (FL OG 1), since he did not consider it important for the music that he played. Ralsgård was motivated to extend his C2 key since he preferred that sound to the sound produced by the cross fingering [34/]. This is also in contrast to O’Grada who explicitly says that he prefers the cross fingered C2, since he needs to be able to use finger articulation. Adding a second Bb touch on FL RA 1 was connected to Ralsgård’s background as a saxophone player. A flute player without that background would perhaps not reflect on the improved balance that this second touch of that particular key might bring. In line with this, comments on anatomic and ergonomic issues are comments on aspects of the individual musician’s use of the instrument. As such, it is a topic that may be

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\(^{39}\) This can however be discussed. The history of music contains stories of musicians trying to alter their bodily properties. Perhaps the most widespread story is about Robert Schumann cutting the webbing of his fingers.
explored in order to address highly specific questions about affordances with regard to musical instruments.

Another dimension of effectivities that emerges in the analysis can be described as embodied habits. Veillon refers to how years of practice have impacted on how he approaches the instrument. In his words: “It’s the way you negotiated your embouchure, the way you set your embouchure to play. And probably, what you are aiming at when you play, without knowing [it].” The extent to which this is the case surprised me when I tried Beznosiuk’s Thibouville flute (FL BE 2). In the situation described in 5.3.1, I tried to step outside my blowing habits, as they have developed through the playing of a certain flute in a particular musical context. Roussel, also addresses the fact that playing one flute for a long time entails adjustments to one’s effectivities. She says that, in order to form an opinion about another flute, she would need to play it for months. It is not because the flute itself changes during this time, but rather because it takes time to adjust to the new flute in order to explore the affordances of that particular interaction.

Closely connected to the notion of effectivities as embodied habits are the musician’s musical preferences. It could be argued that they are two sides of the same coin, one being the cause and the other the effect; the habits are worked into the body according to the aesthetic vision. Taking into consideration the idea of direct perception and the reciprocal relationship between perception and action, habits and preferences might seem inseparable. However, one reason to make a distinction is to highlight the interplay between them, as this is commented upon by the interviewed musicians. The sound ideal is one aspect of musical preference that has an impact on the forming of an embouchure and blowing technique. Beznosiuk refers to this as the sound in her head, and O’Grada talks about what sound you seek when you blow into a flute. The interaction between the musical preferences and the habits are also commented upon by Veillon, when he recounts how he had to change his way of blowing when he transferred from his Du Ve flute (FL VE 2) to his Wilkes Rudall & Rose type flute (FL VE 3): “because I started to blow softer, the whole aesthetics [changed]. I started to realise that power is not loudness.” This example is especially interesting because it goes in the other direction than perhaps expected. Veillon had to change his technique due to his instrument, which in turn changed his aesthetic preference.

According to Windsor and de Bézenac (2012), effectivities change as part of musical advancements (see quote in 3.4). Depending on which notion of effectivities that is being changed, this may involve an array of different activities (or exposures) such as technical exercises, broadening musical horizons through listening, deepened theoretical knowledge and practical experience from rehearsals and gigs. The result from the present study also indicates that the effectivities become especially explicit when the musician is playing a flute that he or she is not used to, and that this is a prompt for change.
With regards to changing effectivities, Veillon points at an interesting
difference between discovery and being taught. Veillon says that, discovering
something yourself “creates what you are also.” This is contrasted by being told
about a technique at a workshop. Discovering a technique requires the musician to
be able to perform it, at least once. Hence, the execution of that technique is
inherent to the act of discovery. When being taught, in the sense of someone
demonstrating a technique, the student already has a certain idea of what that
technique, properly executed, should sound/look like.

The three aspects of effectivities discussed here are not exhaustive. An
empirical study set up in another way would possible expose further effectivities.
For example, theoretical knowledge is probably foundational to the choices a
musician makes when he or she acts in the music. This is probably more explicit
when there is an element of improvisation or composition. The perceptual skills
and the ability to act on what is heard is certainly also an essential effectivity.

7.4. The action perception loop

As pointed out in Chapter 3, the concept of affordances assumes a direct
perception without the need for an inner representational process. This close
connection between perception and action is referred to as the perception/action
loop.

During the interviews, all musicians pick up their instruments to demonstrate
various aspects about their flutes and/or their flute playing. As described in the
foregoing chapter, this is often done through a process of searching on the
instrument by playing musical fragments. This indicates that the musical memory
is bound up with both the auditory perception as well as the motor knowledge.
This dimension of affordances is in line with what Menin and Schiavio (2012)
argues to be a productive way of understanding what musical affordances might
be: A “notion of musical affordance [that is] relying on a sub-cognitive, pre-
linguistic, intrinsically motor form of intentionality” (Menin & Schiavio, 2012, p.
210). When Roussel is trying to recreate a certain fingering that she used in a
particular tune, the working of the perception/action loop becomes obvious. The
same is true when Veillon plays a medley of phrases from different tunes in order
to find a relevant musical example. One tune brings forth another and so on until
he finds what he is looking for. It is obvious from these situations that this would
be almost impossible to achieve without the direct contact with the flute. This act
of playing and searching is what Östersjö refers to as thinking-through-practice
(Östersjö, 2010). As mentioned in 2.2.2, Gagné and McPherson (2016) highlight
the need of music research that focuses on psychomotor abilities. Affordances,
used as a lens to study the interaction between musician and musical instrument on
the basis of motor knowledge (such as promoted by Menin and Schiavio (2012)) might prove to be one path into this area of research.

The situations mentioned above are examples of where the perception/action loop is observable in real time. However, the interviewed musicians also directly address this close relationship between action and perception in their statements. It is particularly present in the section on intonation (5.3.6) as in Beznosiuk’s parallel between skiing and playing the flute, as well as Ralsgård’s comment that you need to have your ears turned outwards. Obviously, these musicians are aware of these processes despite the fact that they are – as Roussel points out – partly unconscious.

7.5. Properties and features and of the musical instrument

Given that affordances originate in the relationship between the musician and the musical instrument, there are no affordances inherent in the musical instrument itself; rather the affordances are created through the individual’s interaction with the instrument. The prerequisites for this interaction can be discussed as properties and features of the musical instrument.

In the previous chapter, affordances are discussed as sets of relationships existing in the interaction with the instrument. However, this interaction is embedded in the reciprocal relation between the interviewed musicians and their surrounding environments. That is; the different genres and traditions in which they are situated, the different ensembles they are working with and the instrument makers they are collaborating with. The statements presented in 5.1 show how the prerequisites for finding a flute have changed over time and are very much dependent on where the musician happen to be based. This is in line with the findings of Lochridge (2004). The advent of contemporary makers of simple-system flutes is of course a breakthrough regarding the availability of flutes. However, as the statements from Beznosiuk show, the modern versions are not necessarily of interest to her since they are being adapted towards the market of (Irish) traditional music.

The simple-system flute is a designed object and are, in most cases, hand-made by a maker who has a more or less precise idea of how it is going to be used in the hands of a musician. Windsor & de Bézenac (2012) writes: “The instrument does come with a set of carefully designed affordances which guide exploration and constrain action” (p. 8). From the perspective of the standpoint presented above (7.1), affordances should be changed to features: the features guide exploration, in which the musician, through his or her effectivities, perceives the affordances. These affordances are thus the result of the interaction. However, a musician does
not only elaborate on these features, in this case designed and crafted by the flute maker. When Veillon discovers ways to musically resemble a binioù with his flute (through harmonics and alternative fingerings), he is not only using the features of the flute such as finger holes and keys. Due to his genre specific expertise, he also elaborates on the acoustic properties of the instrument in ways that lay beyond the original intention of the design.

Another, perhaps subtler example of how musicians elaborate on the features of the instrument concerns the long and short F-keys. These keys are present on the flute in order to provide two options for fingering F natural: [234/234a] and [2345b/23]. On some flutes (such as FL RA 4), the two touches are set up to open the same key. This means that there needs only to be one hole for F natural drilled into the hole. In principle, this is considered to be a good thing. However, Veillon and Roussel use both F keys simultaneously in order to alter the pitch of the note F. This would not be possible if both touches opened the same key. Beznosiuk also uses both F keys at once when she plays the note F# in order to make the note sharper.

The properties of the flute, taken as its material constitution, also change over time. Reasons for such changes, as mentioned in the interviews, are due to maintenance (or lack of maintenance), cracking, and the process of breaking in a new flute. As the examples with Ralsgård’s German flutes show, also the features can be changed through modifications, or, as in the case of O’Grada’s original Rudall & Rose flute (FL OG 1), the features may become broken and lose their functions.

To a musician exploring the affordances of an instrument, it might not be of interest to distinguish between properties and features in such way. However, in a further discussion on the relation between a maker and a musician, this distinction may be of interest. Also, as will be explored below, viewing the instrument as a source for interpretative inspiration, the intention in the design might become of interest for a musician.

7.5.1. Other perceived qualities

Beyond the features and properties of the instrument, the value that some of the musicians in the study ascribe certain instruments also informs the relation between the flute and the flute player. This is a quality of the instrument as an historical valuable object that may not have direct impact on the actual playing situation. However, as is evident in the interviews, this sense of value affects in what contexts the musicians use their instruments and what modifications to them they would consider. Similar to the (sometimes strongly opinionated) texts published during the 19th century (Bigio, 2006/2011), the simple-system flute is still an on-going site of negotiations regarding aesthetic values and preferences.
With its presence in several genres and traditions, this instrument has never ceased to develop and change. As such, it is still in the dialectical relationship with its surroundings, as Racy (1994) argues is always the case with musical instruments. This is clearly an aspect of the relationship between the musician and the musical instrument that would benefit by further research in line with the body of research presented in 2.2.3 (Dawe, 2001; Racy, 1994; Qureshi; 1997; Bates 2012; Wettermark, 2016). It is, however, beyond the scope of this thesis to go deeper into these issues. For now, it suffices to say that there are such qualities and they certainly have bearing on the everyday use of the instrument, as well as on considerations regarding repair work and modifications.

7.5.2. Modifying the features of the instrument

The modification of features of the flute is discussed in two ways in the foregoing chapter. Both ways represent strategies to facilitate new or altered affordances. The first is the modification on current instruments. This is done to Veillon’s first and second flute (FL VE 1 and FL VE 2), and to Ralsgård’s German flutes (FL RA 1 and FL RA 2). The modifications of these flutes are examples of attempts to modify the features of the flute, in order for them to correspond more closely to the effectivities of the musicians and the demands from the repertoire. Through this, the affordances also change, opening up for new possible actions. Both Veillon and Ralsgård provide examples where the results of these modifications were not satisfying, and new modifications had to be made in order to correct the mistakes.

The work of Morvan provides an example of the second strategy for altering the features of the musical instrument. This process is primarily done through the development of new models of flutes. This development is motivated by his own musical preferences as well as the collaboration with other musicians, among them Veillon. The sound of Matt Molloy, referred to as Le Hout, has been a driving force behind Morvan’s work. The same is true for Patrick Olwell, the flute maker interviewed in Lochridge’s (2004) study. He describes a similar circular relationship between the work as a flute maker, the musicians playing his instrument, and his own musicianship. The way notable musicians collaborate with these makers resembles the stories of the flute makers of the 19th century London and their virtuosi, such as Nicholson and Pratten.

These ways of modifying the features of the flute in order to change the affordances are in contrast to the process of adapting the playing technique to meet the requirements of a certain flutes (see 7.6.1). In short, it is a question of adapting the flute, or adapting to the flute and these processes can be seen as two ends of the same continuum. While clearly gravitating towards one side, it is hard to think of a scenario where one of these processes unfolds totally exclusively of the other.
Going even further on the continuum would at some stage result in the invention of a new model of flute. This is what happened when the simple-system flute emerged from the one-keyed transverse flute, and again when Boehm invented his new key system.

7.6. Overlapping affordances

The categories of affordances do not exist separate from each other. In fact, a musical action draws from all of these categories. This allows for a way to discuss and think of musical action and creativity as bound up with the interaction with the instrument. A close relationship with the instrument and sensitivity to its affordances allows the musician to both perceive and act on possibilities for actions in the repertoire. This resonates with Nilsson’s wording, “It [the musical instrument] is my being-in-the-music-world” (Nilsson, 2011, p. 143-144).

7.6.1. Affordance of guidance

In this section, I will present one aspect of overlapping affordances that draws upon the four categories of affordances presented in Chapter 6. Affordances of guidance are relevant in order to adapt to a certain flute. While this approach is found at one end of a continuum, the approach of adapting the instrument is found on the other end.

Beznosiuk praises the flexibility of her Rudall & Rose flute (FL BE 1), stating that “you could do anything with this flute.” She is however also very interested in the various potentials (strengths and weaknesses) of her other instruments. This is most explicit in her statements about her Thibouville flute (FL BE 2). She considers the flute to be less flexible and rather limited, saying that it has one thing that is does. What she refers to as “the French sound” is “just there”, in contrast to it being achievable, but not immediately present, on her Rudall & Rose flute (FL BE 1). The perceived limitation of FL BE 2 is directing the player to a certain way of approaching the instrument (such as blowing in a way that is sensitive to the potential of each individual note). Beznosiuk’s interest in this limitation is related to the historical dimension of her musical context. This flute is inherent to her genre since its design and construction is closely related in time, place and context to the repertoire she plays. As such, it is a guide to performance practice and interpretation of this repertoire. Thus, in this situation, the limitation is an affordance which guides her towards making certain stylistically musical choices. In Beznosiuk’s words: “the flute becomes the teacher.” This resonates with Gibson’s original formulation, that affordances are what the environment “provides or furnishes for good or ill” (1979/1986, p. 127). What is for ill for one
person may be for good for someone else. In this case, what can be perceived as a constraint or resistance is also a source of information, depending on the perspective of the musician. In 6.4 the musical instrument is mentioned as a tool for perceiving possibilities for action in the repertoire. The limitation of flexibility in Beznosiuk’s Thibouville flute (FL BE 2) can be understood as limiting the affordances of the repertoire. Since the flute does demand a certain playing style, some interpretative alternatives are excluded, or at least harder to achieve. However, exploring the affordances of guidance requires the musician to consciously change the effectivities according to the affordances of the flute. This is also addressed in Beznosiuk’s comment on the fertile in asking her students to “stop trying to make it work”. By backing off from their habits, the flute “is showing the way”. In other words, by trying to put your own effectivities inside brackets, you open up for the possibility to adjust yourself towards the unfamiliar instrument. Similar processes, described by musicians and artist-researchers, include Ljungar-Chapelon’s (2002) study regarding the Basse de Traversière. This instrument was reconstructed from old sources by flute maker Alain Weemaels. However, the essence of the project is not the musical instrument itself, but the process that was involved when Ljungar-Chapelon set out to master the flute. In his description about this process is evident that the new instrument demanded him to drastically adapt his playing technique. This has been beneficial regarding his playing on other types of transverse flutes: “It has had an almost therapeutic effect on my flute playing in general” (Ljungar-Chapelon, 2002, p. 26, my translation).

Seen from this perspective, Ralsgård’s experimentation on his German flutes (FL RA 1 and FL RA 2) presents an interesting case. He thinks of these flutes as having a history in Swedish traditional music. Yet, his approach towards these flutes is rather different from Beznosiuk’s approach. To Ralsgård, these flutes do not afford guidance regarding the interpretation of Swedish traditional music, but are rather a point of departure for experimentation. The freedom to experiment with these flutes, as opposed to the flute made by Wahl (FL RA 4), is related to the quality ascribed to the latter as a valuable historical object. The collaboration between Morvan and Veillon is also a process related to Ralsgård’s experiments. Morvan strives to develop his flutes according to a certain vision, informed by the collaboration with Veillon and other flute players. Instead of modifying existing flutes, this is achieved through the design and production of new models. His statement, “the most important thing is that the musician is able to forget about the instrument itself”, can be understood as an ideal goal that his instruments seamlessly fit the vision of the musician so that the musical instrument becomes transparent.\(^{40}\)

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\(^{40}\) The idea of the musical instrument as a natural extension of the body has been subject for research projects, such as the project described in the above-mentioned article by Nijs, Lesaffre and Leman (2013).
Paying attention to the affordances of guidance can be understood as the opposite to the process of modifying the features of the musical instrument. As mentioned above, it is a question of the player adapting to the instrument on one hand, and adapting the instrument to the player, on the other. The two contrasting approaches can be seen as two ends of a continuum (Figure 39).

The continuum is a visualisation of two perspectives on the simple-system flute, as a historical instrument and as a contemporary instrument situated in a tradition. That the term tradition in itself carries notions of history (Ronström, 1989) should not be confused with the instrument itself as a carrier of historical information. Depending on which instrument a musician is playing, the approaches to the tradition may vary, even regarding the same tradition (von Wachenfeldt, Brändström, & Liljas, 2013; Tullberg, in press).

7.6.2. The issue with F# and F natural

While the affordance of guidance is an example of overlapping affordances, a discussion about a seemingly small technical detail can open up a path to study how affordances are interwoven. The notes F and F# in the first two octaves form the basis for such a discussion. Statements regarding these two notes reoccur in several places in Chapter 5. The discussion goes back to the 19th century sources and is apparently still relevant today. Thoughts about these notes span all categories of affordances; it is obviously a matter of fingering which in turn is bound up with behaviours regarding the column of air, giving rise to certain
potentials of sound. Additionally, the repertoire informs the various approaches taken in the matter.

In the interviews, four different ways of producing the note F in the first two octaves were considered: (i) half-holing [234/2(3)], (ii) using the short F key [234/234a], (iii) using the long F key [234b/23], and (iv) cross fingering [234/24]. Veillon notes that the alternative of half-holing (i) is easier to execute satisfactorily on a flute with large finger holes. O’Grada adds that this alternative works best on slow tunes where the player has time to correct the intonation through careful placement of the fingers. Both alternatives (ii and iii) that include the use of keys are considered unproblematic, with the exception for legato passages containing the successive notes D/Eb-F-Ab. This problem, referred to by Brown (2002) as a “perennial problem” (p. 21), is brought up in two of the interviews, exemplified by the passage in Beethovens Eroica symphony (Figure 24, Chapter 5) (Beznosiuk) and the Swedish traditional tune by Jöns Persson (Figure 32, Chapter 5) (Ralsgård). As explained in 5.3.7, the problem of this fingering combination is due to the sideways movement that is required by either the left hand little finger or the right hand ring finger. It is against this background that Beznosiuk brings up the cross fingered alternative (iv). This solution demands a flute with small holes (such as her French Thibouville flute [FL BL 2] but not her English Rudall & Rose [FL BL 1]). Ralsgård’s solution to the “perennial problem” was to add an extra Ab key [FL RA 2]. The choice was informed by the background (effectivities) of the two musicians, Ralsgård refers to his background as a saxophone player as an inspiration for his solution, while the cross fingering is close at hand for Beznosiuk since she is used to play one-keyed transverse flutes.

This is obviously a discussion on fingering, but since the solutions presented are dependent on the size of the finger holes, it is also a discussion about preferences regarding the column of air and sound. Ralsgård enlarged the holes on his flute [FL RA 2] to modify the tuning (see 5.4.1) and timbre (see 5.2.4). Nicholson, who advocated for the use of large finger holes (as found on his improved flutes and a factor leading to his notoriously strong sound), argued that a passage containing the “perennial problem” should be rewritten in order to be executed properly (Brown, 2002). This approach is in contrast to Beznosiuk’s sensitive approach using the cross fingered alternative (iv) on her Thibouville flute [FL BE 2]: “It’s a question of less air and changing the speed of the air and changing the volume of the air”. The difference between my own playing technique and that used by Beznosiuk on her French flute is obvious in the incident recounted in 5.3.1. Beznosiuk relates her approach taken regarding the column of air to the music that she performs, stating that changing the speed and volume of air “is how the music works as well”. Ralsgård too, makes a reference to the repertoire he is playing when he states that D major is a very common key in Swedish traditional music (hence it is crucial to modify his flute to fit his sense of intonation). Indeed even
on her large-holed Rudall & Rose [FL BE 1], Beznosiuk considers it necessary to open one or two of the F keys in order to sharpen the F#.

As mentioned in chapter 2, Bloom (1985) sees the issue regarding hole sizes as a matter of priority: “a trade-off between the ease of execution of the small hole flute with eight keys, and the enormity of […] the sound produced by the large hole flute” (Bloom, 1985, p. 20). This trade-off becomes critical with regards to the fifth finger hole: large holes will make the cross-fingered alternative of F natural (iv) too sharp, while small holes will result in a flat F#. Although this kind of subjective statements regarding temperament and intonation are serious simplifications of the matter (what is too sharp according to what standard?), they are reflected in statements by the musicians in the present study. Also, Tulou, a proponent of the small-holed flute, acknowledged the problem of the flat F natural caused by the small holes, hence his invention of the F# key (1835/1995).

Boehm’s cylinder flute provided one solution to the F/F# problem. He devised a system that is both able to produce an F natural with easy fingering and full sonority, and able to produce an F# in desired pitch. As discussed above, however, the spatial layout of the instrument is of utmost importance, and it can be argued the simple-system flute is biased towards D major, while Boehm sought to devise a key neutral system: “a system of fingering by which all scales, passages, and trills in the twenty-four keys could be played, clearly, certainly, and with the greatest possible ease” (Boehm, 1871/1964, p. 59). Even if we assume that Boehm’s system actually does allow for a more even performance through all twenty-four keys, this is not an advantage to all flute players in all musical genres.

One of the explanations to the favouring of the simple-system flute in Irish traditional music may be the spatial layout, especially the fingering for F# [234/2], providing the possibility of producing the ornamentation associated to that particular style of flute playing. As is evident from the results of the present study and resonating with the findings in Lochridge’s master’s thesis, the dominant market of Irish traditional music has led to alterations in the design of the simple-system flute. These alterations make the flute produced with the Irish traditional flutist in mind, less relevant for a flute player such as Beznosiuk who are oriented towards 19th century Western art music.

The F#/F natural issue cuts across the categories of affordances in that it is a question about fingering, but also about the usage of air and sound. Ultimately, it is a reflection of the meeting between different musical genres (in terms of technical demands and aesthetic preferences) and the construction of the musical instrument.

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41 Searching for “Boehm flute” in an internet forum dedicated to Irish traditional music, such as thesession.org, exposes discussions on how to tackle specific technical issues on the Boehm flute, easily executed on the simple-system flute (www.thesession.org, 2018). Some of these issues concerns the fingering for F# on Boehm’s system.
7.7. Unfolding affordances

The empirical material of this study is based on interviews and each interview only provides statements from one occasion. That is, there is no temporal dimension emerging from repeated interviews over time. However, all of the interviewed musicians do talk about their career and their development as musicians. O’Grada, Beznosiuk, Ralsgård and Veillon also refer to situations of teaching, such as formal education, workshops, and private tuition. These statements provide an insight on the relationship between affordances and learning. As Windsor and de Bézenac (2012) remind us, learning from a Gibsonian perspective “is to discover […] and become attuned to, more and more subtle affordances. Of relevance to this is Folkestad’s argument that creative action can be understood “as the ability to perceive new affordances, or old affordances anew, and to elaborate these affordances in each situation” (2012, p. 6). Taken together, a musician learns to perceive of, and act on, new affordances and, through creative curiosity, incorporates them into his or her musical practice. This implicates a path of learning that is closely connected to the act of exploration. This is emphasised by Veillon in his comment on differences between the processes of discovering a certain playing technique on the one hand and being taught the same technique on the other. It is also reflected in O’Grada’s comment about the necessity for students to “work things out themselves”. Also, Beznosiuk’s instruction to students to “stop trying to make it work” points in the direction of exploration as a path of learning. The empirical material suggests that adapting to another flute is one way of cultivating one’s sensitivities to the affordances of the instrument. This is further enforced by examples of descriptions of tangent processes already mentioned (Ljungar-Chapelon, 2002; Rudolph, 2009).

7.7.1. Negative changes in the affordances

Viewing learning as the development of effectivities in order to explore affordances, it is also apparent that these effectivities also can develop in a negative way. This is perhaps most frequent regarding temporary changes in effectivities. Examples mentioned in the present study include having a cold (O’Grada) or “losing” the embouchure due to absence of practice (Roussel). Negative changes to affordances (or even lost affordances) are also due to changes in the instrument. Such examples taken from the present study include lack of maintenance and cracks. Such negative changes to the affordances, either due to changes in the effectivities of the musician or due to changes in the flute, effectively restricts the possibilities for musical action.
7.7.2. Doing is knowing

The two modes of reflection articulated by Schön (1983), *reflection-in-action* and *reflection-on-action* are interwoven with each other throughout the interviews. As mentioned in 4.2, a significant portion of the statements belonging to the latter category is made with references to teaching practice. Although not the focus for the present study, it is thus implied that teaching situations are spaces for problem setting (explicit or implicit) and problem solving. Roussel, whose career mainly has involved work as a freelance musician and not so much as a teacher, at one occasion sighs and explains: “you are the only one who has ever asked me these questions”. She is also heavily dependent on the interaction with her instrument in the process of formulating her answers. For all of the interviewed musicians, it can be established that the act of flute playing is an essential part of both articulating verbal explanations and providing examples. From this follows that the perceived affordances constitute the basis for the process of reflection-in-action. When the affordances are restricted, due to limitations in the effectivities or problems with the musical instrument, this basis is diminished.

7.8. Back to Gibson

In the following section, I will recapitulate some of Gibson’s (1979/1986) original writings about affordances. As apparent in Chapter 3, the concept of affordances has been interpreted and applied in various ways by researchers elaborating on Gibson’s theories. In this chapter, I have presented an interpretation of affordances, which is a result of the analysis of the empirical material of the present study. While this interpretation may differ from some of the researchers use of the concept of affordance, as I will show, it is still coherent with Gibson’s original ideas.

The chapter on affordances provided in *The Ecological Approach to Visual Perception* (Gibson, 1979/1986), is seventeen pages long. One of the often-quoted sentences in the beginning of the chapter reads: “The *affordances* of the environment are what it offers the animal, what it *provides* or *furnishes*, either for good or ill” (1979, p. 127). As Chimero (2003) points out, this explanation of affordances is “deceptively simple” (p. 182). This simplicity is one of the advantages of the concept as it is easy to relate to and is instantly thought provoking. However, the fact that it is deceptive is obvious from the multitude of different approaches taken by researchers inspired by Gibson. One of the most critical points of debate regarding the interpretation of affordances is how broadly the idea of direct perception – and thereby also affordances – can be applied. In order to frame the arguments emerging in this debate, I remind the reader of the following quotes presented in Chapter 3. On the one hand, affordances are: (i)
“opportunities for action in the environment of an organism, the opportunities in question include everything the organism can do, and the environment includes the entire realm of potential activity for that organism” (Sanders, 1997, p. 108, in Windsor & de Bézenac, 2012, p. 4). On the other hand, affordances are (ii): “properties of the intentional relationship between a musical object and a musical subject” (Menin & Schiavio, 2012, p. 211). There is a difference in scope between the positions represented in the two quotes. The interpretation of affordances that has emerged from the analysis of the empirical material and presented in this chapter is more related to the latter quote in that it is closely connected to the musical practice and the musician’s concrete, physical relationship with the musical instrument. However, as is obvious throughout the statements in Chapter 5, the affordances described are reflections of contextual conditions with cultural, social, aesthetic and historical connections. While not taken as affordances in themselves, it is hard to see how any study of musical affordances would benefit from omitting these issues of the interaction.

Another key element in Gibson’s original writings on affordances is: “an affordance is neither an objective property nor a subjective property; or it is both if you like. An affordance cuts across the dichotomy of subjective–objective.” (1979, p. 129). I will return to Chimero (2003), again borrowing from his comments on Gibson’s formulation: “This description makes affordances seem like impossible, ghostly entities” (p. 182). However, the empirical material analysed in the present study points at the concrete nature of affordances. While being neither objective properties nor subjective, they do not appear to be neither impossible nor ghostly. Rather, the affordances presented in this chapter are tangible assets that the interviewed musicians use, explore, develop and discuss in everyday life.

7.9. Summary

In this chapter, I have discussed the empirical results presented in Chapter 5 and 6 through the lens of the theoretical framework and previous research. The concept of affordances has been defined as relations between the musician and the musical instrument that constitute the opportunities for action. This definition has been articulated from the examples of affordances that emerged from the analysis of the empirical material. These affordances are dependent on the features and properties of the instrument as well as on the effectivities of the musician. The categories of affordances discussed in this chapter are: (i) the column of air, which affords actions such as articulating, emphasising rhythmic elements, intonation, breathing/pausing; (ii) the sound, which affords actions such as varying timbres; (iii) the fingering, which affords actions in form of multiple ways of producing notes, each fingering with particular qualities of pitch, timbre and volume; and (iv)
the personal perception of the repertoire, which affords a interpretative choices, and as a continuation, an individual playing style. The complexity of overlapping affordances has been discussed in terms of affordances of guidance, through which the musical instrument becomes a source for interpretation. A divide in approaches exists, stretching from adapting the flute to adapting to the flute. These approaches are tied to the historical dimension of the instrument. In other words, whether the instrument is used as a source for interpretative guidance, or if it is modified in order to facilitate a certain aesthetic vision. The discussion regarding the two notes F natural and F# has also been used to highlight how the different categories of affordances are bound up with each other in practice. Learning has been discussed in terms of unfolding affordances, opening up wider possibilities for musical action. It has also been noted that affordances can be negatively influenced by the musician’s effectivities, as well as by problems with the instrument. This is further connected to the process of reflection-in-action.

The discussion of affordances presented here meets the descriptions given by Gibson (1979/1986). The examples provided here also further the understanding of musical affordances as closely related to the musical practice, as promoted by Menin and Schiavio (2012). It is, however, obvious that these affordances are tied up with historical, cultural and social meanings. Further research on musical affordances must be sensitive to these contextual dimensions, or environmental conditions. Omitting these will only show the tip of the iceberg and leave out the complexity of the relationship between the musician and the musical instrument. To deepen the understanding of affordances in relation to musical instruments, similar in-depth studies concerning a wider array of musical instruments are needed. As stated by Dogantan-Dack (2015): “In the context of artistic performance as research, understanding the affordances of different kinds of musical instruments becomes crucial in exploring the means through which new insights and knowledge might emerge” (Dogantan-Dack, 2015, p. 173). This is certainly not only of importance regarding artistic performance as research, but in all areas where the performance of music is of importance, including research in music education.

Finally, returning to what I wrote in the introduction, I argue that the concept of affordances allows for an understanding of that exceptional quality I find in some musicians – the ability to squeeze the maximal expression from their instruments in any given musical situation. Furthermore, this understanding implies a path through which this quality can be achieved. Taking the musical instrument as a transducer of gestures, the affordances define the scope of gestures that can be transduced at any given moment. The wider array of affordances that are available for the musician to act upon, the wider array of gestures that can be converted from physical to musical.
In this chapter I will discuss some thoughts and ideas on the implications of the study and address the need for further research. I will recommend two approaches to further research; (i) a collaborative approach and (ii) an autoethnographic approach.

8.1. Educational implications

The results from the present study imply an exploratory approach aiming to deepen the sensitivity to the possibilities of the unique combination of musician/musical instrument. This approach may be highly relevant in order to develop the personal dimension of music making in all stages of learning: from a playful introduction to an instrument at early age, to the artistic curiosity and refinement desirable in higher music education. An exploratory approach may be a natural route in order to develop aspects such as extended techniques and improvisation. In line with this, the unique musical instrument of choice emerges as a point of departure for development of the more nuanced aspects of musicianship. Perhaps the simple-system flute, not being standardised as modern instruments may be, stands out as particularly individual. However, to some degree this translates to all handcrafted musical instruments. As mentioned in Chapter 2, Aho (2016) reminds us that “the musical instrument is […] invented twice, once by its maker, and then again by the person who plays it” (p. 16).

The results from the present study further imply learning as situated. The statements made in the interviews are naturally embedded in musical context. The musical genre or tradition that the musician is situated in is the backdrop for all discussions on playing technique even on a very detailed level. It is the driving force behind the musicianship and cannot be separated from the technical progression.

The affordances of the repertoire are tied to the personal perception, individual taste and background of the musician. This suggests an exploratory approach also to the interpretation of the music and development of a personal aesthetic. Each category of affordances can be explored in order to widen the possibilities for musical action. Furthermore, the overlapping and combination of the affordances
is an area that addresses the otherwise potentially evasive notion of creativity. In my own genre, Swedish traditional music, I have met frustrated students wondering what the instruction, “play yourself” or “play from your heart”, and similar vague comments, may mean. Understanding personal style as affordances of the repertoire, guided by the potential of the instrument of choice, can perhaps provide a more concrete approach by visualising the potential musical actions at hand. One technique of amplifying this perspective suggested by the empirical results of the present study is to swap a familiar flute for an unfamiliar one. This is also a way to challenge and develop the musician’s effectivities. A way to further develop the ability to reflect upon the music is to engage in teaching, thus being prompted to explicate both problem solving as well as problem setting.

8.2. A collaborative approach

Although some of the interviewed musicians touch upon the subject, the interaction between musicians is a theme not explored in the present study. Indeed, the theory of affordances might at first seem to be a theoretical perspective suited to study the action on the individual level. However, as is emerging from the results in the present study, the individual relationship between musician and musical instrument is formed by the context, shifting in time and place. This implies an understanding of learning as situated (Menin & Shiavio, 2012; Barab & Roth, 2006). Affordances, taken as a lens to study learning, can be combined with theories on communities of practice (Lave & Wenger, 1991/2011). Focusing on the social dimension of learning, this theoretical landscape can be used as an extension of Gibson’s ideas. As mentioned above (3.3), Gibson acknowledges the interaction between people as highly important, but leaves the reader with the comment that “the affordances of human behaviour are staggering. No more of that will be considered at this stage except to point out that speech, pictures, and writing still have to be perceived” (Gibson, 1979/1986, p. 137). In their argument for a combination of the theory of affordances and theories on situated learning, Barab & Roth (2006) outline some aspects of knowing, central to the latter theories:

(a) knowing is an activity – not a thing; (b) knowing is always contextualized – not abstract; (c) knowing is reciprocally constructed in the individual – environment interaction – not objectively defined or subjectively created; and (d) knowing is a functional stance on the interaction – not a “truth” (Barab & Roth, 2006, p. 3).

Outlining the theory of affordances, it is hard to see that Gibson would disagree with these four tenets of knowing.
A collaborative approach may also be fruitful to explore another theme that is in need of further research from the perspective of affordances – development over time. This is addressed in the present study through the interviewed musicians’ stories about their careers. This is however told in retrospect and could not be studied as it unfolded. A collaborative approach opens up possibilities of an explicit involvement of the participating musicians and their experiences. The empirical study in such research projects could consist of workshops and/or rehearsals. Perhaps including reflections of the participants documented in journals or through interviews.

8.3. An autoethnographic approach

My own (embodied) experience as a flute player has been of significant value to the shaping, conducting, analysing, and writing of the present thesis. The results from the interview study have been understood against my own embodied experience, as this partly constitutes my horizon of understanding. Following from the analytical work, inspired by the hermeneutic circle, this embodied understanding has expanded and developed. Furthermore, this has made me realise that the interaction between musician and musical instrument is dependent on the subtlest nuances. It also involves ways of knowing that are not always easy to communicate through spoken language. As Dogantan-Dack (2015) reminds us:

> In performance making, the mechanisms of intelligibility and expression are bound up with the material affordances of the instrument, such that the sensuous, kinaesthetic-tactile knowing becomes foundational, and not secondary, in shaping a particular interpretation (p. 175).

These nuances and forms of knowledge are evasive and do not easily transfer into spoken language. In an article on phenomenological analysis, Hycner (1985) states that:

> Language, by its nature can enhance or distil an experience. In any case a description is not the experience itself. The best we can do through the medium of language is to be one step removed from the original experience. (p. 295)

In the light of the above quotes, there are dimensions of the interaction between musician and musical instrument that will be lost in an interview situation. By turning to one’s own experience, the musician/researcher may apprehend these subtle nuances as perceived through embodied forms of knowledge.

Autoethnographic studies focusing of this relation may prove to be a way forward in this area of research. As Krüger (2008) states, autoethnographic
research can “convey an immediacy and intensity in the author’s feelings and thoughts, which might not be conveyed through descriptions of behaviours about other people” (p. 69). Autoethnographic studies are sometimes divided into evocative autoethnography and analytic autoethnography (Anderson, 2006). In the light of the present study, the analytic approach, building on the results from interviews presented here, seems to be a promising path: "Unlike evocative autoethnography, which seeks narrative fidelity only to the researcher’s subjective experience, analytic autoethnography is grounded in self-experience but reaches beyond it as well” (Anderson, 2006, p. 385). This, he argues, is a way to prevent the risk of self-absorption, a tendency which autoethnographic method sometimes is criticised for (Delamont, 2007).

An autoethnographic approach may be a productive way to study learning – understood as the exploration and expansion of affordances – through artistic projects. By documenting events such as recording situations, rehearsals, and individual practice sessions, a corpus of empirical material could provide the basis for an analysis which spirals between what is seen/heard in the documentation and the embodied understanding of what happened in the documented situation.

One path to theoretically deepen the understanding of affordances could be to draw upon the phenomenological tradition. The similarities between Gibson’s ideas and the continental phenomenological philosophers have been commented upon before (Sanders, 1993, Bonderup Dohn, 2006, Dotov, Nie & de Wit, 2012). References are made primarily to Merleau-Ponty’s work on the phenomenology of perception. Ideas of Gibson and Merleau-Ponty also jointly contribute to the theoretical discussions in some of the research mentioned above (Östersjö, 2010; Nilsson, 2011; Aho, 2016).
9. References


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