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BACHELOR THESIS

Teaching an "Invisible" Instrument

How do harmonica teachers explain things that cannot be seen?

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Abstract

The purpose of this study was to find different teaching strategies on the harmonica to solve the problem with everything happening inside the mouth, hidden from sight. We also made comparisons to singing, having the same teaching prerequisites, to see if there where any similarities. To this end we interviewed four experienced harmonica teachers as well as studied instructional material on both harmonica and singing. The results of the interviews were divided into, by us, chosen categories. Conclusions in short: We found several different strategies that are commonly used, and that the best way to make sure the student understands, is to combine several of those. Which combination to use depends on the student. We found some similarities with singing, but not as many as we had hoped for.

Kudos

We would like to express our gratitude to Rosco Selley who, during a brain storming session prior to this study came up with the idea of doing research about the invisibleness of the harmonica.

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Introduction

Mikael Bäckman

When I started playing the harmonica in the late 80s the only way to learn was to teach your self how to play. There were no teachers in the area where I lived and since this was pre-internet days, I was unaware of the few instruction books that were out there. I did what most harmonica players before me have done; sit down in front of the record player and try to figure out what your idols are doing.

I bought a Hohner Pro Harp in the key of A and tried to imitate what I heard Sonny Boy Williamson and Little Walter play on my records, with little or no success. Their harmonicas sounded completely different to mine, even if I heard they were in the right key, so I went out and bought a Hohner Blues Harp and I thought this must sound bluesy, like it does on my turntable; however it didn't. It took me many hours of trial and error to figure out how to play all those techniques they used in their playing to make the harmonica sound bluesy.

When I had my first private student in the mid 90s he was fascinated by the same sounds I had been when I begun, and he wanted me to explain what I did to produce those sounds; I was dumbfounded. Since I had learned in a very intuitive way, I really had no idea what was going on inside my mouth: I could play it and it sounded good so I had no reason whatsoever to analyze what I was doing.

Showing him how to do it was out of the question, there was a harmonica blocking the view. Quite a few students and many hours of hard thinking later, I gradually became more aware of what I was doing and also capable of communicating this to others. This awareness and knowledge made me a better player and a much better teacher, so since that day, I have been very fascinated with finding different ways to explain to my students what is actually going on inside my mouth.

Over the years I have come to realize that all students are different, they all have different learning strategies, what makes perfect sense to one student might mean nothing to another student. Therefore I realized that there was a need to explain this in many different ways.

Daniel Boström

When I was fourteen I started singing in my first choir. Since then I've been singing in different choirs for twelve years running now, including two and a half years with the Piteå Musikhögskolans Chamber Choir. But it wasn't until I started taking individual singing lessons, which I have been for about two years now, that I really started to wonder what was going on inside my throat.

I've always listened to a lot of music, quite early in life it became my greatest passion in life and I've always sung by myself playing the piano. Like with Mikael's harmonica playing, I've learned almost all my singing by ear. Of course I got some little tips from the choir leaders every now and then, but there is a great difference between singing in a choir and pop singing. All my choir singing has been of the classical kind, and that doesn't really transfer to pop, the basics are there but then they take separate ways pretty quick.

I wasn't really that aware of this fact until I started my lessons. I'm also suddenly faced with the fact that my teacher can't show me what to do, only try to explain and hope that I understand. And sometimes I've wondered if I'm really doing what the teachers trying to explain. On all the instruments I'm taking lessons in or have taken lessons in, the teacher can just show me how to do, like piano for instance: Hold your hand like this, play that key over there and so forth. Now in singing it's more: Try to move your voice back in the throat and keep a constant pressure from your support (while learning how to sound more *grunge*).

I've also seen two endoscopic films that helped me understand how my inside actually look, but it didn't give much more than that. And one day I spoke with Mikael and soon realized that we were facing similar problems, so we decided to join forces. So to me it's very interesting to see what different techniques matches or separates the two.

Research Question

By invisible instruments, in this study, we mean instruments where you cannot show what you are doing to achieve certain playing techniques because they take place inside your mouth. For example: The bending of notes on the harmonica, how to close off your nasal cavity when singing. There are other instruments that fall partly under this description, for example trumpet, saxophone, flute and clarinet. These are only partly *invisible* since you can show the student what the fingers are supposed to do, when playing the harmonica and singing, everything is invisible.

When teaching the harmonica you cannot, unlike with the piano, show the students how certain techniques are executed. All the different playing techniques that are involved in harmonica playing are regulated by elements inside the mouth and oral cavity. For example, the tongue might need to be in a certain position or move in a certain way, obviously you cannot show this to your student – such things have to be explained by other means. Similar problems can also be found in the teaching of singing.

Therefore we wanted to examine different ways of getting around this problem. Since we are both going to teach in this or related areas, we will have great benefits form this research in our future line of work. Our main research question thus is: *How do you teach someone something you cannot physically show, in this case: playing the harmonica?*

Key Concepts

Note bending:

> …the technique which is used by harmonica players (particularly blues and jazz players) to alter the pitch of the note being played by changing the shape of the vocal tract, particularly by changes in the position of the tongue (Johnston, 1987).
>
> …it is the higher note of the hole that appears to be bendable, whether blown or drawn. The often stated rule is that one can bend the pitch of the higher note in a hole down to a semitone above the lower note of the respective hole. It should be pointed out that

> bending produces virtually continuous pitch control within the interval between the blow and draw notes of the hole…(Bahnson et al, 1998).
>
> Round about the turn of the century, an unknown harmonica player in the USA made an extraordinary discovery: he found that if he altered the airstream by changing the shape of the inside of his mouth whilst playing certain notes, he could gradually lower the pitch of the note in "glissando" as much as three semitiones below its normal level. This discovery was what first enabled blues to be played on the harp, since it made it possible to play a scale containing a minor 3rd, and a flattened 5th as well as a minor 7th, the so called "blue notes", in the key of the draw chord (G on a C harp) (Baker, 1999).

For a listening example of what note bending sounds like, we refer to Howard Levys harmonica playing on "Carnival of Souls" on the CD Trio Globo: Carnival of Souls, Silver Wave Records, 1995.

Straight notes:
Notes that are not bent.

Harp:
In many parts of the American South, the harmonica is called *mouth harp*, *French harp* or just plain *harp*. The term is partly inspired by the *Aeolian harp*, a stringed instrument that is left outdoors to be played by the wind, whose name was taken from Aeolus, the god of the wind (www.patmissin.com/ffaq/q3.html).

Hohner:
German harmonica manufacturer. The first company to mass-produce harmonicas and to export instruments to the USA. "Hohner is still the biggest and most influential manufacturer, with the largest range…"(Baker, 1999).

4 or four:
When we are referring to numbers and write 4 instead of four, we always mean a hole in the harmonica, in this case hole 4.

Articulation:
Directions to a performer typically through symbols and icons on a musical score that indicate characteristics of the attack, duration, and decay (or envelope) of a given note (www.music.vt.edu/musicdictionary/).

Reed:
A flat piece of metal inside the harmonica that is fastened in one end. When air passes it vibrates and produces a tone.

Larynx:
A cartilaginous structure at the top trachea; contains elastic vocal chords that are the source of the vocal tone in speech (www.die.net).

Pharynx:
The passage to the stomach and lungs; in the front part of the neck below the chin and above the collarbone (www.die.net).

Embouchure:
In this study we use embouchure as a definition of how big the opening in your mouth is when playing the harmonica, i.e. Single hole embouchure: Only one hole is played.
It can also describe different ways of playing a single note as defined by John Watts:

> Embouchure is just a fancy way of saying how your mouth and the harmonica come together for playing. There are three embouchures that are commonly used to get a clean single note on the harmonica, pucker (sometimes called "lipping"), U-block, or tongue block (www.coast2coastmusic.com/diatonic/embouchure.shtml).

Overblowing:
Chris Michalek defines overblowing as follows:

> Overblows are basically blow bends on holes 1, 4,5,6 and overdraws are draw bends on holes 7,9,10. The reason they are not considered bent notes is because the notes do not "bend" down to a lower note but instead "pop" up to a high note. The action and technique is nearly the same as bending (www.coast2coastmusic.com/diatonic/overblows.shtml).

Previous research

Sources concerning harmonica

"The harmonica is arguably the most widely played instrument in the world, yet there is a surprising paucity of published studies of its acoustics or physical dynamics" (Bahnson et al, 1998). Since the instrument is so widely played, it is perhaps even more surprising to find that the paucity of published studies regarding the pedagogical aspect of harmonica playing is even larger.

The first scientific study made about the harmonica that we have found was conducted by Robert Johnston at the Monash University in Melbourne (Johnston, 1987). His thesis was that the length of the air column decides the pitch of a bendable note. This he proved by attaching the harmonica to a bicycle pump and a two-way vacuum cleaner pump. By doing this he managed to play all the bends on the harmonica by varying the length of the air column, using the bicycle-pump to simulate the throat.

Johnston made the following observations about pitch bending:

> A: The note can only be flattened.
>
> B: Only certain notes can be bent – low draw notes and high blow notes. The detailed rule is simple – the only notes that can be bent are those where the other note in the same channel (i.e. the draw note when a blow note is being played) has a lower pitch than the one being played…
>
> C: The degree to which the pitch can be bent is also related to the pitch of the other note in the same channel. The rule is that, for those notes that can be bent, the pitch can be varied from the normal pitch of the note being played, down to approximately a semitone sharp of the pitch of the other note in the same channel…

> D: For draw notes the pitch variation is essentially continuous between the upper and lower pitch limits for a continuous change in mouth geometry. For the high notes, the pitch change tends to be abrupt between the limits.
>
> E: The technique that is used to achieve these changes, while complex, is essentially as follows. For medium to high pitched notes the size of the oral cavity, controlled by the position of the tongue, seems to be the crucial factor. For medium pitch draw bends, the tongue is pushed down and back to flatten the pitch. For the high blow bends, the tongue is pushed forward and as mentioned above the pitch drops more or less abruptly. In both cases the higher notes are played with the tongue further forward in the mouth. For very low pitched notes the movement of the tongue is less pronounced and it is noticed that the Adam's apple drops on bending to lower pitch, and this is an indication that the larynx is being lowered (Johnston, 1987).

A small criticism towards this study is that Johnston claims that a high-pitched blow bend tends to drop in pitch more or less abruptly. We know for a fact that this is wrong. Not only is one of us able to do it, but we also have an example on record. This record is by Trio Globo where Howard Levy plays the harmonica on the song "Yello Cello". There he bends 10 blow down two semitones, from F to Eb at 01:48 and bends from the bend to the straight note on hole 8, from Ab to A.

In 1995 Bahnson, Antaki and Beery did further studies on this subject. They used more sophisticated instruments, such as stroboscopic evaluation and dynamic vibration measurements, to study the reeds when being blown, drawn and bent. They explain the technique of bending as follows: "Alterations of the vocal tract involved in bending tones principally consists of arching and/or thickening the tongue at various places along its length (anterior or posterior). This has the effect of altering the volume and shape of the resonant cavity" (Bahnson et al, 1998). They focused more of their study on a technique called over-blowing.

This study was mostly about the harmonica but they also state that:

> …in order to understand the dynamic function of harmonica playing, the human vocal tract most also be studied…the acoustic impedance of the vocal tract controls not only quality of tones but it also raises or lowers the pitch in order to achieve certain notes. A wide variety of air flow rates, vocal cavity volumes and vocal configurations are compatible with the production of natural tones from the harmonica. To produce a more natural tone requires not only adequate shape of the vocal tract, but good musical sense and a sensitive auditory-vocal feedback mechanism. It appears that the volume and shape of the vocal tract have only a slight effect on the natural tones, but the mode and frequency of the fashioned notes – bent, overblown, or overdrawn – are caused by changes in the vocal tract (Bahnson et al, 1998).

Since we have chosen to compare the harmonica strategies with singing in this study, due to the similar problem of "invisibleness" in the two, the particular statement above is also interesting to us.

Another interesting area they study is that of the resonance in the oral cavity and its importance in bending notes.

> In a preliminary study of one aspect of the vocal tract, namely the volume of the oral cavity, a simple experiment was conducted in which a player, lying supine, played specific fashioned notes and then held the configuration of the vocal tract while the oral cavity was filled with water and the required volume was recorded. …it is probable that actual playing volumes were larger than measured, since when water was instilled, constriction of the glossopharynx and larynx occurred to suppress the swallow reflex and prevent aspiration. The volume of the anterior oral cavity was found to be inversely related to pitch as modified by bending. This relationship was not found with the straight notes which could be obtained with a wide range of airway volumes (Bahnson et al, 1998).

In 1987 Steve Baker wrote *The Harp Handbook*, (Baker, 1999) which he later revised in 1999. This is the first seriously acknowledged harmonica instruction book. Material written prior to this had not made any real in-depth attempts at describing the various playing techniques of the harmonica. This paved the way for other serious harmonica instruction materials such as books, videos and Cds, for example the works of David Barrett.

We have used Baker's book because he thoroughly explains how to bend notes and some examples of using syllables for articulation of rhythmic patterns. When he explains the bending process he talks about the importance of altering the shape of the vocal tract.

> I think the best analogy to use for the tongue and throat movements used when bending notes is different vowel sounds – after all everyone uses the various vowels all the time when speaking. Bending is a process which can only lower the pitch of a bendable note, so that it is necessary to lower the resonance frequency of the vocal tract in order to achieve this (Baker, 1999).

He also makes use of syllables to further explain the process of bending:

> I always say it's like going from saying "AAH" (normal note) to saying "OOH" (bent note), though the vocal chords play no part in this, as you don't vocalize these sounds but simply form them in your mouth and throat. "OOH" comes from much deeper in the throat than "AAH", so it automatically enlarges the space at the back of the tongue, producing a vocal tract form with a lower resonance frequency. …The lower the note, the deeper in the throat the whole thing takes place, and the deeper the vowels are that you have to form. The higher the note, the nearer the front of the mouth the whole process happens, and the vowels involved become more like "EEE-OOO" (Baker, 1999).

The syllables he uses are: *Chaa-chicka*, *Hoo-ka-ti-ka* and *Taa-hooka-taa*. He also makes use of some pictures to help explain bending. Detailed descriptions of what physically happens inside the harmonica when playing are also found here.

David Barrett has on the subject written several books. We have chosen to use his *Building Harmonica Technique (Book, Video*; Barrett, 1994*), Complete Classic Chicago Blues Harmonica* (Barrett, 1995*), Basic Blues Harmonica Method Level 1* (Barrett, 2000*).*

Barrett's material is basically about the same things as Baker's book, but he has some variations and differences in certain areas. The syllables he uses to explain the bending

process are: *E-O*, *Oy* (as in "boy") and for the higher pitched bends *Shhh*. The syllables he uses for articulation are: *Ha*, *Ga* and *Ta*.

Barrett also talks about the importance of the tongue's position in the mouth while bending notes. There are also many illustrations to help the reader understand what needs to be done. Although a cross-section view of the oral cavity is helpful, the student would be more helped by actually seeing his/her own oral cavity while playing.

Like with Baker, we find detailed descriptions of the inner workings of the harmonica here. Interesting things he takes up in his video is that he uses his hands as a visual aid to explain what the tongue does inside the mouth and also talks about creating a constricted air passage for bending notes. To further explain the meaning of a constricted air passage we quote Barrett:

> The goal is to create a specific constricted air passage here (points to his throat) to basically change the air pressure of the air going through the harmonica (Barrett, 2000).

In one section of the video he removes the harmonica from his mouth while showing how to bend.

One of the most knowledgeable players when it comes to note bending is Howard Levy. He has written an article which is published on his website, *Getting the Overblows and Overdraws*(Levy, 2003*)* as well as produced a instruction video, *New Direction for Harmonica*(Levy, 1992*)*.

Levy discusses the position of the tongue in the mouth while bending and the importance of creating the proper resonance for the bending of notes. While explaining how to play a high-pitched bend he uses the syllable *Ng* as in "Hung". Like David Barrett does in his video, Levy also removes the harmonica while bending.

One of the few magazines that deals with harmonica pedagogics is *Harmonica Information Publication* (Yerxa*)*. In issue nr 4 there is an article that deals with note bending: *Bending and Overblowing – All One Donut* (Yerxa, 1996*)*. It has some illustrations and technical data about the harmonica. He also writes about the importance of resonance.

> Just like a reed will sound a different note depending on its length and shape, the size and volume of the mouth cavity will create its own resonant frequency that will reinforce some notes and not others (Yerxa, 1996).

A number of books written about the harmonica's role in different genres, also explains how to bend notes:
Country music: *All American Harp* (McCoy, 1998)
Bluegrass music: *Bluegrass Harmonica* (Stevens, 1992*)*
Irish music: *Irish & American Fiddle Tunes for the Harmonica* (Weiser, 1998)

The sections explaining bending are fairly brief, but do contain some additional information and variations that are of interest for us. For example McCoy uses a whistling analogy. He explains that you should whistle a descending scale and feel how your tongue moves backward when you whistle lower notes.

Former Muddy Waters alumni ‚Jerry Portnoy, has produced three-CD instructional package called *Blues Harmonica Masterclass* (Portnoy, 1997*)*. It has large sections dealing with note bending and use of syllables for bends and articulation. The description of the bending process is very similar to the writings of Baker and Barrett, however, he has some variations of the syllables he uses, especially for articulation.

Another book that explains the bending process *is Sourcebook of Little Walter / Big Walter Licks for Blues Harmonica* (Ball, 2000*)*. He talks about altering the shape of the mouth, moving the tongue back and also uses syllables. He also uses some illustrations to exemplify this.

Sources concerning singing

Another *invisible* instrument is the human voice. Therefore we have studied some material in that area too.

The Singers and Actors Throat (Punt, 1979) is mainly a book about how to use your voice in a proper way. What is interesting for this study is a number of things. He states that:

> There is no point in the singer filling his head with too great a knowledge of the anatomy and physiology of the organs concerned with singing. Such details, though commonly included in works intended only for the singer, are of no more use to him than a description of the shoulder joint would be to a cricketer, or the visual apparatus to a marksman (Punt, 1979).

Punt also states that:

> The vocal mechanism is a **reed** instrument. The vibratile parts of the larynx known as vocal cords are *not* cords or strings, but really folds or ledges having only one free border, so comparisons with stringed instruments are invalid. It might be compared to an organ having only one pipe and a double reed, but the reed and the pipe, being made of contractile living tissue, can be varied inconsistency, shape and dimensions; consequently a large range of notes with countless variations and rapid changes in pitch, intensity and timbre (quality) can be produced (Punt, 1979).

Punt talks about which components in the oral cavity that are involved when forming vowels and consonants. He also uses vowels to explain how certain singing techniques are to be executed. There are also numerous anatomical illustrations throughout the book.

"*Vokalmetodikk"* (Hansen, 1993) is a book for both teachers and students. Hansen feels that knowledge of the anatomical parts involved in singing is very important. Feedback from the students is to Hansen, an important part for the teacher, to make sure that the student has really understood. Like Punt, he also uses vowels, consonants and syllables for developing certain aspects of singing. He also talks about the importance of being relaxed:

> To get the most out of practice and teaching it is important that you work from the basic rule, that you use the least amount of force to obtain the desired results (Hansen, 1993).

He points out that the biggest factors involved in creating resonance are: the tongue, the soft palate, the angle of the jaw and the lips. In the book he mentions that x-ray films have been made to study the movement of the thyroid in singing.

"The Voice Book" (McCallion, 1998) is written for singers and actors and others who use their voice in their profession. Like Hansen, he talks about the importance of not using excessive force:

> Good use exists when the effort needed to perform a task, whether it's lifting a bucket of concrete, sitting in a chair, or producing the voice, is just sufficient for the performance of that task (McCallion, 1998).

Once again we see use of syllables, consonants and vowels, where he states that the syllables are very important for the rhythmic structure of a word. He also discusses anatomy. The sensations of what is going on in the oral cavity, he points out, are very subjective and individual, therefore hard to explain to someone else. Resonance is also discussed: "…every change in the position of the organs of articulation brings about a change of resonance…" (McCallion, 1998). The book contains a large number of illustrations and photographs.

"Vocal Method" *(*Marchesi, No Printing Year Noted) This is mainly a book of different singing exercises. It contains a practical guide for students that is of interest for us. She has some interesting ideas concerning different languages and dialects.

> Not only do these faults of pronunciation of the various nationalities differ among themselves, but they vary very considerably even among pupils of the same country, being the result either of a special organization, bad habits, or the particular dialect spoken in each of the provincial towns of the different countries (Marchesi, NPYN).

She also talks about vowels and consonants.

We have chosen to make comparisons between harmonica playing and singing. Much of the techniques involved in the two are very similar to each other, and everything takes place inside the oral cavity, hence the "invisibility" of both instruments.

The curriculum for the Swedish mandatory school system states and requires that: "The tuition shall be adapted to each student's conditions and needs." (lpo 94) Since each student have different conditions and ways of learning it is important for us to find different ways of teaching. Therefore we need to find several strategies for showing that which cannot be shown physically.

Method

We chose to interview four experienced harmonica teachers. We have also gathered information from research about the harmonica and harmonica instructional books and videos, and then compared that with literature about singing.

The informants were chosen with consideration for their teaching experience, their internationally renowned status as sought after lecturers and also in view of the teaching materials they have written.

The interviews were conducted in a journalistic way, with both low degree of standardization and structure, according to Patel & Davidson (Patel & Davidson, 2003). We are aware of that our questions may be leading, but they are leading in a direction towards knowledge that is important to our study.

> The decisive matter – for interview questions and for research questions – is not whether they are leading or not leading but where the questions in fact lead, if they lead in important directions that gives new and valuable knowledge (Kvale, 1997).

The interviews make this study qualitative since such studies strive towards understanding and interpreting the knowledge of a small group of people.

> Qualitative studies are characterized by trying to reach understanding of an individual or a group of individuals life values (Hartman, 1998).

This is a small study but we feel that the informants experience in combination with our teaching experience and education makes this study valid and reliable.

The informants:

The informants are presented with their real names since they required it to be that way. The fact that they want their names made public when sharing their knowledge points to the fact that there is paucity in scientific research in this area.

David Barrett
Born in San José, California on February 6,1973. He has played the harmonica since he was fourteen years old. He studied classical theory at De Anza College for three years. He started teaching the harmonica at age eighteen and today he teaches full-time, both workshops and private students. He has also written a large number of books on how to play blues harmonica (see Previous Research).

Winslow Yerxa
Born in Vancouver, British Columbia, Canada on November 2, 1953. He has played the harmonica since he was fourteen years old. He has been teaching for the last 30 years and presently teach a few nights a week. He's the publisher of the Harmonica Information Publication (Harmonica Information Press) and has written several articles about harmonica playing.

Steve Baker
Born in London, England on May 1, 1953. He has played the harmonica since the late sixties. He started working as a harmonica consultant for Hohner in 1987, and he also started doing workshops at the same time. Today he teaches a few private students and does approximately fifteen to twenty workshops per year. He is the author of The Harp Handbook (Wise Publications, 1999).

Joe Filisko
Born in1967 in Geissen, Germany. He started to play the harmonica while in college, where he also took guitar lessons and studied theory. He started teaching in the early 90's. Today he

teaches one day a week at the Old Town School in Chicago. He also teaches at harmonica festivals, approximately eight to twelve workshops per year.

Procedure

Three of the informants were interviewed personally at the World Harmonica Festival in Trossingen, Germany. The fourth informant was interviewed via telephone. The interviews were recorded on minidisk and then transcribed and analyzed. They ranged from 45 to 85 minutes and filled ten to eighteen pages of text.

Results

This chapter is structured in the following way:
The four key questions of the interview are presented. For each question, we sum up the answers from all four informants. We could have presented the informants one by one, but since we found several similarities in the answers, we preferred this mode of presentation.

The questions were:

1. Do you have a specific method to explain what you cannot show visually?
2. Do you use any specific aids to explain what you cannot show visually?
3. Do you use syllables to explain specific techniques?
4. The first time you are to teach a pupil how to bend notes, how do you explain it?

As seen in the "Previous Research" chapter, techniques involved in bending notes all take place inside the oral cavity, hence the relevance of the fourth question.

Methods of explanation

Winslow Yerxa talks about getting feedback from your students. "So I'll ask people: Ok, where's your tongue? What's it doing? Is it doing this? Is it doing that?"

Getting feedback from the student is also important to Joe Filisko.

> So it's really based on me watching them, listening to them and giving out the information that I feel like, is going to help them and not frustrate and confuse them.

He summarizes his teaching method as follows:

> …I try not to over explain stuff. I may introduce a song or a technique and I just say the most basic thing about it, I let them try it and then I make assessments on what I'm watching and hearing and if they're getting it, or if they're on the path to getting it, I keep my mouth shut and just offer encouragement. If I can see that they're clearly not getting it, then I start to like try to go into explaining, or giving visuals, it really depends on locking in to what that person's individual language is. Explaining it so they can understand it.

David Barrett comments on the fact that it's not always only the student that cannot see what is actually going on, the teacher cannot see inside the student's mouth either.

> Sometimes I'll say the opposite of what they should do. 'Cause when I tell them to *do this* they're actually doing the opposite and they really don't know what their tongue is doing all the time.

Steve Baker uses a method of playing without the harmonica, demonstrating for example the breathing position. "…wide open throat, jaw open, lips brought forward, corners of the mouth together…"

Winslow Yerxa also talks about how the student must internalize the teachings to really understand them:

> …you can create certain visual pictures for people so that they can use those conceptually, but that doesn't really help unless they can relate that also to the physical sensations that are going on, that they only really detect in a tactile way, and which they're not really used to thinking about. It' a question of awareness.

Visual Aids

They all use some kinds of visual aids in their teaching. Joe Filisko uses the handle of a plastic milk carton, which he cuts out and drills holes in. When he places this object in his mouth and places his tongue on it the student can clearly see what he does.

> The next step if they're not getting that is I'll give them one, make them stand in front of a mirror and do it.

Winslow Yerxa uses his hands to simulate the tongue and the roof of the mouth and also mimics how a reed works with his fingers.

> …one hand you could hold up with the palm facing down and that's the roof of the mouth, and the knuckles of the other hand can be the tongue…I think it helps to create something visual, again we're facing that problem of everything being mysterious because you can't see it.

He also draws pictures to help explain things.

Drawing pictures is an aid that David Barrett also uses. He likes the process of having the students see something built from a blank page, instead of giving them pre-made handouts.

> And I might write down on a piece of paper and kinda show 'em the arch of the roof of the mouth to the soft palate. If they're having difficulties with that, kinda 3 bend, showing them where they're not following the contour of the roof of the mouth. That's why you're getting the jump in pitch.
>
> …I like the process of showing how something's built. So just for them even seeing you write something…and I might have to do that five times with them through different subject matters. But by them seeing that five times it starts getting integrated in their minds. I could just give them a hand-out and we'd go through the hand-out. The hand-out already exists so I personally like that process of just starting with a blank page.

> Even in my workshops. Even though I have a real detailed hand-out, I write everything from scratch on the board because I'd like them to see that process.

An ear-nose-throat chart also hangs in his studio. One of his instructors, Kinya Pollard, uses a bobcat skull and an artificial tongue.

Steve Baker has done an endoscopic film at the university hospital in Hamburg. They put an endoscopic camera through his nose and down the throat so you see the larynx from above. It shows what happens inside his throat while playing different techniques. He actually uses this in teaching situations:

> I use it sometimes, if I'm teaching classes you know, I mean I just did a work shop in France at a festival, uh two weeks ago where I showed this to demonstrate some of the things that happen inside the body. Cause this is the difficult point about playing the harmonica, that is the tough thing about it, is that you have to show all this invisible stuff…

Syllables for bending

> …when I do get into note bending, especially with my classes, I found one of the easiest ways to introduce some of the beginning stages of note bending are to use these little words or syllables…(Filisko).

Steve Baker points out that: "…it isn't really a vowel, you're not going AA-OO in that sense but it's similar to it."

Three of the four informants use some version of the *K* sound to help the student find the correct position of the tongue and the appropriate size of the oral cavity when bending notes. Yerxa uses *Kay* and *Kssssshh,* Baker uses a soft *Kuh*. Whereas Barrett uses the *K* sound in the words *Key* and *Kou*.

Yerxa explains the significance of the *K* sound like this:

> …it begins with the breath being totally stopped with the tongue and then the tongue releasing it, that explosive sound giving the *K,* and then doing it in slow motion, saying: Ok, we're gonna stop at a certain point along that line.

Other syllables used by the informants are:
G sounds: Yerxa, Filisko (Gou, Gwah)
A sounds: Baker (going from Aah to Ooh)
O sounds: Yerxa (Ou)
E sounds: Yerxa, Barrett
T sounds: Filisko (Tu, Twah)
W sounds: Filisko (Wah)
D sounds: Filisko (Du, Dwah)
NG sounds: Barrett

Syllables for articulation

Joe Filisko uses a number of different syllables to explain articulations of chords and also combinations of these to explain the rhythms. The syllables he uses includes *Hoo, Haa, Hee, Haw, Ahdah, Dudleah*. An explanation of a certain rhythm might look like this: (see figure 1)

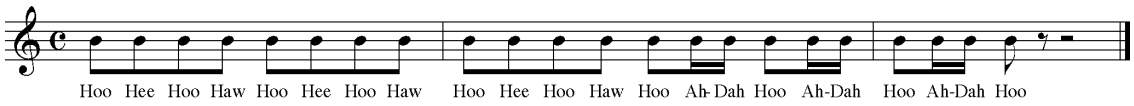

Figure 1

Steve Baker also uses certain syllables for articulation. *Kuh, Tuh*, *Fuh, Wuh* are examples of that. Steve Baker explains why he uses the analogy of speech:

> …because you use all of the speech organs when playing the harmonica, from the vocal folds through to the lips, the throat, the larynx, the pharynx, the back of the tongue, the middle of the tongue, the front of the tongue, the soft palate, the hard palate, the teeth and the lips, you use all of these. And in almost exactly the same way as you do in speech and the major difference is that in speech the notes are articulated by the vocal folds, in the larynx where as with the harmonica they're articulated by the reeds in the harmonica at the other end of the vocal tract but otherwise its pretty similar to song…

David Barrett expresses some difficulties in the language department:

> I find it difficult to teach, especially, Asian students because of the certain different tongue positions that are quite different than the English language.

Yerxa has the same line of thought on that subject.

Other strategies on how to bend notes

There are different opinions concerning whether to explain the physics of the harmonica, i.e. what happens inside the harmonica when you bend a note, or not. David Barrett starts with explaining this whilst Winslow Yerxa means that it depends on the students' learning strategies and interests.

> I don't know if it's helpful to talk about the reed theory that underlies it, it depends, you know some people are very technically minded and they wanna know that stuff, they wanna understand it on that level immediately. Other people, that's not gonna help them.

Resonance is a subject which all of the informants talk about. They explain that you have to enlarge the air column to accommodate a lower note. Baker means that: "…you have to create the acoustic, the conditions of acoustic impedance which will permit it to sound…"

Yerxa says: “I do try to talk about creating a place, without necessarily calling it a resonant cavity in the center of the mouth…”
Filisko explains it this way: “I’m creating that particular mouth shape that, with no force and if you find that mouth shape in your own mouth, the note will bend.”
“…how to tune in your mouth to the note you’re trying to achieve in the bend.” is the way that David Barrett explains it.

Another way they describe how to produce this resonance is with a whistling analogy. Filisko and Barrett both compare the bending process to what your tongue does when you lower the pitch of a note when you whistle. Filisko says:

> The whistling analogy works good, especially because it’s a great opportunity to get the point across that when you whistle, you don’t go (exemplifies by trying to whistle by blowing very hard) you know when you whistle you (whistles) you’re very relaxed. So that really connects with people generally really well you know, and then just telling them you wanna play the bend just whistle the bend (whistles), try to do that when you’re playing the harmonica.

Barrett also compares it with the movement of a plunger in a slide-whistle.

Filisko sometimes take the harmonica away from his mouth while bending to further exemplify what takes place inside the mouth.

> And then the other thing is just to sort of tell people that like, ok you wanna play 4 (plays on the harmonica), you wanna play the bent note, (plays on the harmonica) all you need to do is go; (sounds the bend without the harmonica, by breathing). And by taking the harmonica away from my mouth and I am creating that sound, it really helps drive the point home that I’m not being forceful…

Baker, as mentioned earlier, uses a similar strategy, but also uses it for straight notes.

To create a constricted air passage is, according to Yerxa and Barrett, what actually creates a bent note. Barrett says:

> …tongue needs to go up to create the constricted air passage, and I talk more of what that means, constriction, ‘cause that can be a real negative thing if you don’t understand what that means.

A way of gradually introducing the student to note bending is to teach them how to slightly lower the pitch of a note, not to bring forth a new note, but more to make the note more expressive. Barrett calls this “Bending for expression”, whereas Filisko talks about it as “…a technique that adds ornamentation, adds a blues, a bluesy type effect.”

Discussion

The purpose of this study is to find different strategies to teach someone something you cannot physically show. In this chapter we will discuss such strategies and make comparisons to the previous research. From our informants and the previous research we found the following strategies:

1. Getting feedback from students
2. Use of visual aids
3. Use of syllables for bending notes
4. Use of syllables for articulation
5. Explaining the physics of the harmonica
6. Talking about resonance
7. The whistling analogy
8. Playing without the harmonica
9. Talking about a constricted air passage
10. Bending for expression

Getting feedback from students

A very important part of teaching is that your students understand what you are trying to explain. This is why feedback from the students is a very effective strategy since you cannot actually see, with your own eyes, if the student understood your instruction. There is an old saying that goes like this: *You can never be sure of what you have actually said to a person until he says it to you.*

It is important to be aware of the fact that you, as a teacher, might interpret what your students say in a way that differs from what the student intended. Joe Filisko said that:

> …me and all my students speak the same language but then again we don't really speak the same language. Because if they were to describe something and I was to describe something we may describe it completely differently.

Not only may two people describe the same thing differently, but two people may also interpret the same information differently. Consequently, there are two variables involved:

One: The way you, as a teacher, describe something is your highly personal version of how it should be explained.

Two: The way your student interprets your description is his or hers highly personal version of what you described.

Use of visual aids

Since some students are very visual it is important to find ways of showing them what they need to do. Since all four informants, and most of the material we have studied, all make use of visual aids of some sort, we come to the conclusion that this is a very important strategy. We find this to be a very useful way since the hands are flexible and can therefore easily simulate the movements of the tongue.

Drawing pictures is the most used visual aid, both in harmonica playing and in singing. It is useful not only to show the student what the inside looks like, but also to help the student create a mental image of what he/she is supposed to do to reach desired results.
To some students a picture might be too abstract. To these students the endoscopic and ultrasound movies made might be useful.

However, visual aids do not conquer the problem that we cannot see what goes on inside our mouth. Drawing a picture of what the inside of your mouth looks like, or watching an ultrasound or endoscopic film does not show the student what they really need to see: their own oral cavity. If they could see that, while playing, the problem would be solved, however, with current technology this is not practical in a daily teaching situation.

Use of syllables for bending notes

When it comes to explaining how to bend notes the use of syllables is the most common strategy though the syllables used may vary. We find that this is the least abstract of the strategies since it uses speech, something that almost everybody uses on a daily basis. We feel that it is important to be aware of that there are different languages and dialects, which may position the tongue differently in the mouth, thus creating a different effect. When looking to the literature, and cross-referencing it with the interviews, we find several examples of the following syllables:

A sounds
E sounds
O sounds
K sounds

The examples above are only a sample of the different syllables that we found. In our opinion, the wealth of syllables being used, and the fact that all of the informants and most of the literature use syllables for explaining the bending process gives validity to our conclusion that this is a very wide spread and efficient strategy.

Use of syllables for articulation

The only strategy we have found on how to explain articulation of single notes and chords is syllables. There are a very wide variety of syllables to this end since there are a large number of various articulations to be explained.

Once again, speech is something that nearly everyone can easily relate to, which may explain why we have found no other strategies for explaining different articulations, this seems to work so well there simply is no need for any other strategy. The criticism about different dialects and languages as describes in the section about syllables for bending notes also apply here.

We also find relevance in this area when we compare it to singing, though in singing the various forms of syllables, vowels and consonants are used to teach other specific techniques and such. So there is no direct connection to these two syllable based strategies, but we think it gives them even more validity since the connection does exists.

Explaining the physics of the harmonica

The only time we have encountered explanations of the inner workings of the harmonica, in combination with a pedagogic problem, is when bends are to be explained. We find no physical use for this strategy but it is yet another instrument for creating an inner vision for some students. Certainly people who are technically inclined will appreciate this information.

However, it has little or nothing to do with actually playing the harmonica. Unlike all the other strategies it does not explain anything about what needs to be done physically, this is strictly theoretic. But it is a very good way to explain how the harmonica works, and knowing your instrument is useful in other aspects, such as maintenance.

To explain the physics of the harmonica can easily be compared to explaining the anatomy of the voice mechanism. This seems to be more widely used in singing than in harmonica playing, but we feel that it has no more relevance than in harmonica playing. You can teach someone how to sing or play the harmonica without explaining the physics.

Both in singing and harmonica playing, you have no direct control over the reeds of the instrument (in singing, the vocal cords), but through alterations in the oral cavity you control them indirectly. The harmonica could be viewed as a set of vocal cords situated outside of your mouth.

Talking about resonance

As proved by Robert Johnston the resonance chamber is what determines the pitch of a note while bending. The strategies with syllables described above is one way of making the students adjust their resonance chamber with changes of the tongue's position. Two of the informants and much of the literature finds it a useful strategy to be more direct and talk about the need for more resonance to allow a lower note to sound.

This merely a way of explaining what needs to be done, not how to do it and may lie dangerously close to the area of over-explaining, resulting in a confused student. However, talking about the need of more resonance will probably make some students understand why it is necessary to drop your jaw and move your tongue back. Doing this is also given validity from singing since they are part of the main components for creating various resonances.
In both harmonica playing and singing you can sing or play a certain note regardless of resonance. But if you want to amplify the note then you have to, in both cases, find the right resonance.

The whistling analogy

Though not as widely used as the syllable strategy, we think it is a very useful way of explaining how to lower the pitch of a note. Just like the speech analogy, whistling is something that nearly everybody knows how to do. When the student is made aware of what he/she is actually doing when lowering the pitch of a whistled note it is easy to transfer this to the harmonica.

Like Filisko points out it is also a good tool for explaining that you need to be relaxed when bending and not use too much force. Just like in singing it is important not to use more force than what is needed.

It is our experience that some students tend to open their mouth too much when bending, resulting in a 2 hole embouchure, making the bend much harder to execute. This is similar to when you open your mouth while whistling, resulting in loss of tone.

Whistling a note and lowering the pitch also make this a very physical and musical strategy. Using syllables has really nothing to do with music, it is a good analogy, but it is not musical, when you whistle you actually make music.

You create a muscle memory for your oral cavity; in order to make a certain note go down in pitch, your body automatically learns that you need to move your tongue back and drop your jaw just like when you bend a note on the harmonica, this will help your ears to work together with your oral cavity.

Playing without the harmonica

This strategy is used to illustrate bending notes, playing straight notes and also to help students with the rhythm. We find it very useful for those students who might find the use of syllables too abstract, or when language might create a problem. Speechless sounds are the same for everybody regardless of language and dialect. We also find, that in singing, note-less breathing can help with problems like finding your support.

This does obviously not show the student what is going on inside the mouth but it does actually allow the student to hear what is going on. Since the mouth is an area that we never see, what we do inside the oral cavity is directly linked to our ears. We are used to imitate sounds that we hear, be it language or simply sounds, for instance a child imitating the sound of a motorcycle. Therefore, to hear what it sounds like when you bend a note without the harmonica is probably even more useful than to see the process.

Talking about a constricted air passage

Even though this is what physically needs to be done to create the bend, we think that this strategy, along with talking about resonance and the inner workings of the harmonica, is useful only to those students who are technically minded. Both the use of syllables and the whistling analogy explains the need for this without actually mentioning a constricted air passage. However, you may need to exaggerate the syllables and the whistling motion to produce the constriction of air that is needed for a bend, but be very careful not to imply that this means using excessive force, which would produce a weaker tone. So if the student understands that the goal of the syllables is to create a constricted air passage we feel that it is useful to talk about constriction.

Bending for expression

The word bend, in itself, can create a mental block for some students, and they might feel insufficient when they fail to achieve the missing notes created by the bend. Therefore this strategy can be sort of a soft start into the world of bending.

> I never use the word bend with my students. It can sound terribly difficult if they realize that they need to bend a piece of metal just using their breath (Conversation with James Conway).

When bending for expression the important note is not the one you are supposed to bend, but rather the one you are to land on, creating a sort of grace note. Also, when learning to bend, it takes many hours of hard work before you can play the bent notes with accurate intonation.

This requires a good ear and very good control of your tongue to be able to create the correct resonance for the bent note. This can be so frustrating for a student that they give up the instrument entirely, they might feel that they will never succeed. If you start out with bends as ornamentation, which is much easier to learn, the students feel that they are adding a technique which they can use instead of feeling that they are introduced to a technique that they cannot yet use.

We also find it useful since it teaches the student a musical technique that they also can use later on after they've learnt how to bend properly. Like the name implies; it is a good way to make melodies more expressive.

Summary

Since we are to become teachers we are pleased to have found many different strategies to fulfill the needs of all our different students. Which is expected of us as teachers in the Swedish school system.

We find all these strategies useful to some extent, some more than others, but no strategy is sufficient by itself. Combinations of different strategies are the best way to really reach a student. Which combinations to use depend on the preferred learning strategies of the student.

Talking about a constricted air passage may not be sufficient at a point, but then you can combine that with the syllable *K* or *Ng* to reach the effect you have just explained. Filisko says:

> …some seeds you can plant in the ground and they'll sprout in a day or two and some seeds will take weeks. It's just, some people are different, some people they need to have all the pieces there in front of them for a long time before they make the connection.

Further good combinations are for example: Talking about resonance and the whistling analogy, where the analogy exemplifies how to create more resonance.

Visual aids are a great combination with all the other strategies.

To conclude this chapter and our research, we feel that we have found many ways to get around the problem of not being able to see what is going on inside the mouth. The fact that none of the strategies are only mentioned by one source gives them validity. All of the strategies are derived from the interviews and are all mentioned in the previous research.

We are well aware that none of the previous research, with the exception of (Johnston, 1987) and (Bahnson et al, 1998), are scientifically proved, but are the results of observations and logical deduction.

We have not found as many connections to singing as we hoped though, but we realize that this depends a great deal on the limitations we have done. For example our focus on bending that does not exist in singing in a comparable way. The few similarities we have found though, amplifies the validity of our conclusions.

To, as stated in lpo 94, see and fill the needs of all students is not very easy to do, especially not in the case of harmonica playing. Partly because the fact of the physical "invisibility" of

the harmonica but also because the instrument is “invisible” in more areas than that. There are very few schools where you can find a harmonica teacher, and as we have mentioned before there is a great paucity in actual research in the pedagogic area of the instrument. Therefore we feel that we have made an important contribution in making this instrument less “invisible” in all areas. We feel that we have found many different approaches that will help teachers successfully communicate with all kinds of students, with all kinds of different learning strategies. And hopefully this study will lead to even more well educated harmonica pedagogs in the future.

Suggestions for further research

Since we have found no other research on the subject of harmonica pedagogy there is obviously need for more research in the area. In this study we have limited our research to certain techniques involved in harmonica playing. More research about these strategies and perhaps other strategies we have not found, as well as including techniques such as vibrato and overblowing, which we have deliberately left out, is definitely needed.

Another area where studies should be made is the two different ways of producing a single note on the harmonica, namely tongue blocking and the so called pucker or pursed lips style. What effect does these different embouchures have on playing performance and how do you teach them?

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