



Analysis of Breathing Techniques in Flute Playing

Mohd Syazrin Riman¹, Rita Mardhatillah Umar Rauf²

^{1,2}Conservatory of Music, College of Creative Arts, Universiti Teknologi MARA (UiTM), Shah Alam, Malaysia

Email: ²rita_umar@uitm.edu.my

Perfecting one's breathing technique is a fundamental skill among woodwinds players in achieving mastery to control the instrument better. To explore this issue further, this research paper aims to ascertain the strengths of various breathing techniques in flute playing, to strategize the selection and execute a particular breathing technique. Using the piece "Concertino for Flute and Piano" by Cecile Chaminade's recorded performance performed by Jana Jarkovska as an example, this research will observe, document, and carry out thorough performance analysis. Results of this research show that the complexity of the breathing technique is one of the main issues for flute students from all levels to achieve a satisfactory level of mastery. To date, flutist has been utilizing three main types of breathing technique that is a deep breath at the beginning of a section or when having longer rest, bridge breath which is mostly used in between phrasing or in the middle of phrasing, and quick breath, especially in the fast passage. The outcome of this research found that the 'Bridge Breath' is one of the most frequent breath strategies practiced by flutists to get sufficient air when practicing or performing. The findings of this study will help provide players insights on breathing techniques decision-making.

Keywords: *Breathing techniques; flute playing; Concertino for Flute and Piano; woodwinds players; Jana Jarkovska*

Introduction

Music composition is a field that provides composers and musicians to express their creativity through music pieces and instrumentations (Tajuddin et al, 2021). It does help music practitioners such as teachers, students, and researchers to study the music elements and interpretations in the masterpieces (Ismail et al., 2021; Ismail et al., 2020). According to Burns (2019), Concertino for flute and piano was originally composed by Cecile Chaminade for flute and piano but the work has also been written for orchestra. Cecile's repertoire was written on



commission from the Paris Conservatoire in 1902 to be an examination repertoire for flute students. Hence, this is a strong reason for us to choose this repertoire which is entitled Concertino For Flute and Piano since it is still used as an examination repertoire today. Furthermore, before this repertoire was commissioned by the Paris Conservatoire for examination repertoire, Concertino for Flute and Piano was originally dedicated to Cecile Chaminade's lover Paul Taffanel who is a flautist and teacher. However, due to her lover leaving her to marry another person, she composed these extremely hard pieces to take revenge and punish her ex-lover which he would not be able to play. From this view, it is clear that this piece is suitable for this research as it remains popular in flute repertoire and is used as an examination piece (Burns, 2019).

The origin and history of the transverse or side-blown flute were disguised in mystery due to little information and imperfection. Some authorities believe that transverse flute was known in Europe during the early Christian era. In the 16th century by the time of Agricola, flutes were built in a complete family of 4 voices and its shape was a cylinder with very small finger-holes with no joint, unlike today's flutes. But in or about 1660, a famous French flautist known as Philibert was the first one to distinguish himself with the significance in the flute followed by La Barre and the renowned Hotteterre Le Romine (De Lorenzo, 1951). The last-mentioned that it was the first to play transverse flute in the Opera in Paris in or about 1697, in a work by Lully. But, Scarlatti said that he did not like the woodwind player because they never played in tune when asked to hear Quantz, who was the leading flute player of his time even though the one-keyed flute was considered perfect after being grounded for about a century. Then Quantz made an interesting improvement in the flute note and added a second closed key to the foot-joint. However, 40 years after what Quantz did, Tacet and Fiorio introduced flutes with new keys in London between 1770 and 1780. Their example was then spread quickly to England and eventually came into use in Europe.

The optimal flute breathing technique was one of the topics that were argued among flautists and academicians. Even though breathing is a natural action for everyone, it is a fundamental skill that takes time and effort to master, especially for students who are pursuing professional flute education. Without sufficient mastery of the breathing technique, students will have difficulty in grasping other advanced techniques which are part of the learning progress in their music education in striving for maximum performance capacity of playing. (Kara and Bulut, 2015). Vauthrin et al, (2015) also stated that to master the degree of playing control, music performance needs to be developed through extensive training.

Most flute students face breathing problems in flute playing, especially for repertoire that has long phrasing and even running notes. This is due to their insufficient knowledge of the ideal breathing technique. As a general rule, the flute student should first understand the breathing anatomy. Internalising the importance of anatomy, a performance's good posture also influences how well the performer could execute the good flow of air. At the same time, understanding or muscle optimization used during inhaling and exhaling is the requirement of



a player's diaphragm in place as well as the intercostal muscles movement on our rib cage. Moreover, according to Holm (1997), wind instrumentalists especially flautists need to learn how to conserve their air effectively and efficiently due to flute players tend to lose most of the air across the tone hole, unlike other wind instrumentalists.

Breathing Technique in Flute-playing

Proper breathing releases physical tension and allows the muscular coordination to function freely, (Parry, 1998). Undoubtedly, breathing is the most vital physiological factor in all music performances (Cannoly and Williamon., 2004). Particularly, for singers and wind players, breathing is the main source of vocal cord, embouchure, and reed vibration (Kohut DL., 1986). Even though all living things breathe, efficient breathing is developed through the correct technique and repeated practice (Fredericksen and Jacobs, 1996) and (Gaunt, 2005).

Breathing technique is one of the main issues in flute playing and a commonly argued subject among flautists and academicians. Accurate and efficient breathing techniques are fully required in playing a musical piece to engage optimum performance. Vauthri et al (2015), state that Flute players' and teachers claimed that poor breathing control affected the quality of performance. According to Kara and Bulut (2015), students often face certain breathing technique difficulties mostly in a high level of education in the university.

Besides that, although breathing was just a natural action for human beings, as a flautist, the breathing technique is a required skill that is developed, controlled, and eventually mastered. Furthermore, according to Bayley (2002), when students understand the right concept of breathing technique and apply it in their playing, it will give benefits to the student. In addition, correct breathing technique is fundamental to the development of the right playing habit. According to Sanborn (1997) as cited in Bayley (2002), believe that "a student who takes good, healthy, strain-free breath control will be more apt to produce a good sound and to be more relaxed while playing". On the other hand, proper breathing control will help to ensure the tone is focused and steady which will establish accurate intonation. Thus, by doing the right proper breathing technique, it will enable the student to perform musical phrases in a meaningful way.

Furthermore, to perform the right breathing technique, it is crucial to find a good breathing place to breathe without detuning the musical structure. Beginner flute players should be encouraged to mark the places for their breathing and observe it as soon as possible in their study. It is better to break the slur (not tie) than break the rhythm when deciding where to breathe. Breathing before the last note or two of a phrase should be avoided (Putnik, 1973). According to a bachelor dissertation by Smith (2015), Senior Adult Amateur Flautists commonly face a decrease in breath support. Many respondents admitted that their students don't have the stamina to sustain their breath, often experienced shortness of breath, and were unable to support long, sustained phrases. The ageing process thins the bones and weakens the muscles and tissue of the lungs, therefore, affecting breathing.



Breathing Anatomy

Inhalation and exhalation are very important for a musician (Jevtic, 2019). Not only that, but breath control is also vital. Every wind musician must strive to achieve the highest level of expertise. Other than that, the respiratory system is divided into chest wall components: upper thorax or lung-opposed pulmonary rib cage, lower thorax or diaphragm opposed abdominal rib cage, Aliverti et al. (2000). In flute playing, the respiratory system is involved. However, according to Fain (2010), due to the asymmetrical body position which is required to play flute instrument and the unstopped arrangement of our body embouchure, achieving a healthy posture and balance stance must be emphasised by flautist for playing that supports the active respiratory demands of the instrument. Moreover, Jevtic-Somlai (2019), also said that “Many good definitions of support have been introduced by the authors in this section. Each definition reflects individual awareness of the body’s posture and its relevance for breath support” (page?). Other body parts like posture, embouchure, and any body part that is involved in breathing do affect flautist breathing control in playing.

According to Pearson (2000), in her doctoral dissertation, she explains which organ and muscles are used in breathing. She comes to an end in which the intercostal muscles (muscles between the ribs) do about 25% of the muscular work while the diaphragm does about 75% of the work. Besides that, the abdominal wall (360° around the body) and pelvic floor work synergistically with the diaphragm while the lungs hold the air. For instance, according to Ioan, (2007), the breathing process started with inspiration where the external intercostal contract, the ribs expanding, and the diaphragm is pushed down which caused the increasing volume in the thorax(chest) and expansion of the lung which then led to the air suction.

In the retention process, when the lung gets maximum volume of air, the diaphragm compresses the viscera and the external intercostals contract which creates tension in the body and then the air going out naturally. After that, during the expiration process, the internal intercostal and abdominal muscles are involved. The internal intercostal muscles then adduct the ribs, therefore lowering the rib cage and sternum. Then the abdominals are pushing the viscera inside and also pushing the diaphragm upward hence carbon dioxide is expelled out and then the process repeats again.

Cecile Chaminade’s Background

Cécile Chaminade (1857-1923) was a French pianist-composer. Ambroise Thomas once said, “*This is not a woman who composes, but a composer who is a woman*” (Haefner, 2017). According to Oh (2000) and Huang (2019), Cécile Louise Stéphanie Chaminade was born on August, 1857 in Paris and she was the third of four surviving kids. Her parents were music enthusiasts and created a musical environment for their children. Her mother, who was a pianist and singer, provided her with initial musical training.



Chaminade's early works were praised by renowned composer George Bizet (1838-1875). Bizet encouraged her to pursue composition as her musical talent impressed him. She had composed most of her large-scale works, including the Piano Trio op. 11, the Suite d'orchestre op. 20, and Concertstück op. 40 for piano and orchestra before 1890. Her pieces were admired by the public, particularly in England and the United States at that time. Chaminade then married to a music publisher from Mareilles, Louis- Mathieu Carbonel in 1901.

Cecile Chaminade Works

According to Oh (2000) and Park (2019), Cécile Louise Stephanie Chaminade (1857–1944) was a French composer and pianist who was active in the late nineteenth and early twentieth century. Chaminade achieved success during her lifetime mostly because of her solo piano work and songs. Chaminade composed roughly 400 works and almost half of them are piano compositions. For the most part, her musical style belonged to the Romantic tradition rather than the contemporary Impressionism and Expressionism. The characteristic of her musical work is tuneful and a clear tonality. Her tour in Europe and the United States caused her to earn wealth and fame. Other than that, in America there are over 200 clubs organised in her honour. However, her work was forgotten after a decade of her death until the work of scholars like Marcia Citron renewed interest in her works and life.

During her time, we were well known as a composer of salon music. In fact, most of her music is for piano with tuneful melodies and simple ternary structures. Although she composed many character pieces and melodies that are suitable for salon setting throughout her life, Chaminade also composed large works of music especially in the 1880s which included opera, orchestral work and large-form piano solo works. Among his famous work are La Sévillane, Op. 19, Suite D'Orchestre, Op. 20, Les Amazones, Op. 26, Six Etudes de Concert, Op. 35, Concertstück, Op. 40, and Piano Sonata, Op. 21 and many of it was successful. However, Concerstück became her most performed and successful piece among her large works.

Methodology

Research Design

In this study, we have selected three ways of collecting data. The first way is by gathering information through document reading from reliable and trusted sources such as books, articles and journals. The second way is through score analysis through observation on the breathing mark of how the performer prepares breathing in the beginning, middle phrases and a quick breath. The third way is collecting data through performance analysis which is specifically by observing the performer of the selected piece that we have chosen from YouTube. Observing other performers provides the opportunity to observe performance ethics, approaches and expectations (Mohammed, 2017, 2021) either in real life or via online.



Data Collection

The title of this research is “Breathing techniques in flute playing: Concertino for Flute and Piano by Cecile Chaminade”. In this research we focused on breathing techniques. Firstly we stated the objective and research question of this research so when we started to look for information we had a clear direction on what we should look for. After having my fixed objective and research question we proceed on reading a lot of documents, articles and books that are linked to the research area which is breathing technique. Besides that we also get more in-depth about the main topic which leads us to the types of breathing techniques.

Other than that, we also focus on analysing the score by looking at the breathing mark that had already written in the score and comparing it to the performer whether the performer follows all of the breathing marks or just some of the breathing marks. We also analyse the breathing for every phrasing of the melody that the performer has done. Moreover, we observe how the performer takes a breath before starting playing, how and where the performer takes bridge breath and quick breath. Lastly, in this research we conduct a performance analysis by watching YouTube performances. We observed through aurally which is listening to the performance and visually which looked at where did the performer breath. After that we screen capture the part in which the performer takes a breath as evidence for this research.

Score Analysis

The score that has been analysed in this research was not the original version due to the fact that Cecile Chaminade is a French composer and pianist, (Oh, 2000; Park, 2019). Thus, in this research will use the version that has been edited by Louis Moyse. The reason for choosing this version is because of the fact that Louis Moyse is the son of one of the greatest flautists in the twentieth century. According to Cox (2013), Louis Moyse is not only a great pianist and flautist, but he also comes up with his discipline as a flute composer, editor and an inspirational pedagogue. Thus it is clear why this edition is more relevant in this study. Other than that, this version also includes breath mark as below:

position of camera, audio quality, age of player etc. The main reason for us to choose this performer is due to the fact that we can see her clearly from the beginning of the performance video until the end of the performance video which will help me to get a clear image of where she breathes thus the data that i will be collecting is more accurate. There is some part in the video where the video was focused on the piano but however due to audio quality we can still listen to the breathing point which leads to the next paragraph.

Other than that, this performance was also recorded professionally without any noise which gave me the opportunity to listen to clear audio which we can also hear breath point. This also will help me to listen and locate where or which bar she took breath and then compare it with the score whether she follows the breath mark or she takes deep breath, bridge breath or quick breath. Moreover, another reason why i chose this performer is because of her age, which is not too old and not too young where her breathing is still working in high performance and this performance was recorded 4 years ago when she was 34-year-old.

Jana Jarkovska is a Czech young leading flautist, and she was born in 1983. In 2013, she graduated from the Academy of Performing Arts in Prague. Throughout her journey in music life, she won various competitions which in 2003, she won first prize for the National Competition that was held at The Czech Conservatoire. In 2012 she also won the Chieri International Music Competition with pianist Bohumir Stehlik. She also won a Pro Musicis International Award in 2013 at Paris. Other than that, she is a member of the Bellatrix-Trio and Morgenstern Ensemble (Bohemian and Literary, 2019).

Below is the picture of YouTube Performer:



Figure 3: Screenshot of Janna Jarkovska

Findings

The aim of this study was to ascertain different breathing techniques in flute playing and to examine what are the different types of breathing techniques in flute playing? This repertoire is suitable for this study because this repertoire was still becoming a famous examination

repertoire until today since it was composed in 1902 on a commission from the Paris Conservatoire due to it stretching the player's technical abilities.

In this chapter, the findings were presented based on the result gained from the score analysis and video observation. In this study, the focus was to point out the breathing technique used by Jana Jarkovska in performing “Concertino for Flute and Piano by Cecile Chaminade” and how Jana Jarkovska applies effective breathing technique in performing this repertoire. Apart from that, the findings were presented by comparing the suggested breathing point which was marked in the score and Jana Jarkovska Breathing point in the screenshot segment and table.

Section A (*Moderato*)

In this first section I will be discussing the very beginning of this repertoire which is *Moderato*. *Moderato* is a tempo marking that is provided by the composer as an indicator which is assumed as a walking pace but however it depends on the performer.



The image shows the first page of a musical score for the Flute part of 'Concertino for Flute and Piano' by Cecile Chaminade, Op. 90, edited by Louis Meyer. The score is in 3/4 time and begins with a 'Moderato' tempo marking. The first staff is the Flute part, starting with a 'piano' (p) dynamic and a 'poco stringendo' instruction. The score includes various musical notations such as slurs, accents, and dynamic markings like 'p', 'f', and 'ff'. The piece concludes with a 'Piu animato e agitato' tempo change and a 'Stringendo' instruction.

Figure 4: Measures 1 to 72 of Concertino for Flute and Piano

Figure four shows the first movement of Concertino for Flute and Piano. In this section we will concentrate on the illustration above to begin the findings. The tempo for this section is moderate, which is not too slow and not too fast, and the melody is flowing beautifully. This will give performers more time to take air which is in this section the performer probably will use either deep breath or bridge breath. To be informed, deep breath is usually taken in the very beginning of the repertoire or when performers have a couple of bar rest which is provide maximum volume of air while bridge breath taken in between phrasing which is to add on the volume of air to be able to play until the end of phrasing.



Figure 5: Measures 1 to 11, suggested breath mark

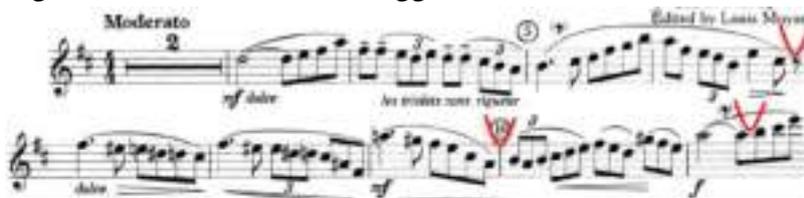


Figure 6: Measures 1 to 11, Jana Jarkovska breathing point

As we can see in figure 5, the suggested breathing point is in bar 5 and bar 11 with purple circle which was originally written by the editor, Louis Moyse. But instead of following the suggested breathing point, as we can see in figure 6, Jana Jarkovska took breath in bar 6 and bar 9 which I marked with red “V” shape but followed the breathing point suggested in bar 11.



Figure 7: Measures 12 to 18, suggested breath mark

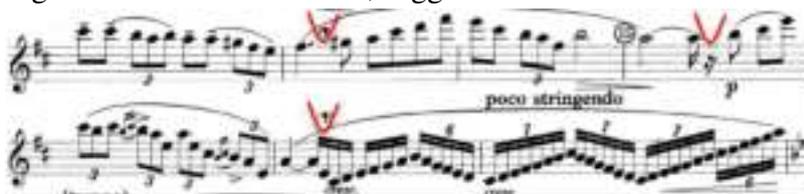


Figure 8: Measures 12 to 18, Jana Jarkovska breathing point

Figure 7 shows the suggested breathing point. But as we can see in figure 8, Jana Jarkovska

follows the suggested breathing mark but however she also took breath in bar 15.



Figure 9: Suggested breath mark in measures 19 to 23



Figure 10: Jana Jarkovska breathing point in measure 19-23

In these measures, Jana Jarkovska, we can see clearly in her performance that she followed all of the suggested breathing marks that has been written in the score as in figure 9 and figure 10.



Figure 11: Suggested breathing point in measure 25-32



Figure 12: Jana Jarkovska breathing point in measure 25-32

In measures, Jana Jarkovska followed both suggested breathing points as in figure 11 but however based on figure 12, Jana Jarkovska took breath in bar 25 and bar 29. In these cases, the breath that she took in bar 25 is considered a quick breath since the value of note is smaller



Figure 15: Jana Jarkovska breathing point in measures 33-40

As we can see in figure 14, there is only one suggested breathing point. However, Jana Jarkovska took breath on three quaver rest which is in bar 33, bar 36, bar 37, one semiquaver rest in bar 35, one in between notes in bar 39 and followed the suggested breathing in bar 40.



Figure 16: Suggested breathing mark in measures 41-48



Figure 17: Jana Jarkovska breathing point in measures 41-48

Based on figure 17, we can clearly see that Jana Jarkovska did not follow the first suggested breath mark in bar 43 which is in figure 16 but followed it in bar 44. Other than that, she also took breaths in bar 47 and bar 48.



Figure 18: Suggested breath mark in measures 49-60



Figure 19: Jana Jarkovska breathing point in measures 49-60

Based on figure 18, there is only one breath mark. Meanwhile figure 19 shows that Jana Jarkovska did not follow it. Instead, she took breath on bar 49, bar 51, bar 56 and bar 59.



Figure 20: Suggested breath mark in measures 60-72



Figure 21: Jana Jarkovksa breathing point in measures 60-72

Based on Figure 20, we can see that there are only 2 breathing points that are suggested which are in bar 64 and bar 65. However, as in figure 21, Jana Jarkovska only followed the suggested breathing point in bar 64 and took breath on bar 60, bar 61, bar 65, bar 68, bar 69 and bar 70.

Section C (*a Tempo vivo*)

In this section, I will be discussing the third part from the repertoire which is *a tempo (vivo)*. The meaning of these musical terms is going back to original tempo but lively and fast in tempo.

In figure 23 we can see that in this part there is no suggested breathing point. However, Jana Jarkovska took breaths in bar 73, bar 75, bar 77 and bar 78. This also clearly shows that she was using quick breath technique since that section tempo was fast. The rest that she took breath also semi quaver which gave very least time to take deep breath and bridge breath. Furthermore it can be easily heard compared to deep breath.



Figure 24: Suggested breathing point in measures 79-83

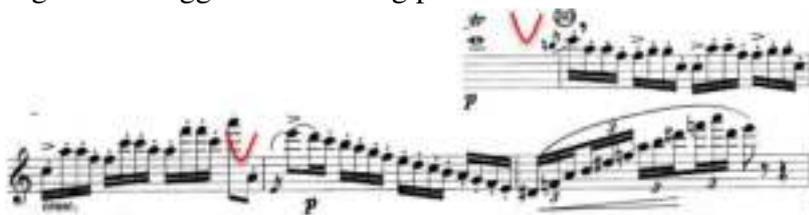


Figure 25: Jana Jarkovska breathing point in measures 79-83

Based on figure 24, there is only one breath mark this was suggested. But figure 25 shows that Jana Jarkovska did not follow it and she took breath in bar 79 and bar 81.

Discussion

In this part, we focus more on the type of breathing that has been utilised by Jana Jarkovska which is deep breath, bridge breath and quick breath. We put them in three different tables which are table 1, table 2 and table 3. Other than that, the final analysis of this study was successful in carrying Research Objective 1 and 2. It also goes in determining the answer to both Research Questions. In terms of types of breathing technique that has been used by Jana Jarkovska when performing this repertoire, Concertino for Flute and Piano, Jana Jarkovska utilised the use of the three types of breathing technique which is deep breath, bridge breath and quick breath. These types of breathing have been applied by Jana Jarkovska almost in every section. Furthermore, she used these types of breathing depending on the character, tempo, and section. For instance, in slow passage such as in Section A, B, D and E she used more bridge breath. Meanwhile quick breath had been used more in fast passages such as in section C and section F. Moreover, deep breath only was used in the beginning of every passage, section or when the repertoire got a crotchet rest or more.

Jana Jarkovska also has a good understanding towards the amount of air needed for certain phrasing that will be enough until the next breathing point that she planned. She also has good control of her breathing and knows how much air she needs to use for certain phrasing. She utilised the types of breathing techniques to achieve this. Thus, this answered the objectives of this study.

Deep Breath

Table 1 shows places where Jana Jarkovska took deep breaths when performing this repertoire.

Table 1: Analysis of deep breath technique

Parts	Bar
	2
	33
	40
	136

Based on Table 1, we can see that Jana Jarkovska has been utilising it for 13 times. If you take a closer look, she only took deep breaths in the beginning of each section or passage. The reason for this is due to the rest in the previous bar which gave her more time to inhale air. It can be seen clearly on table 2 and table 3 below.

Table 2: Deep breath factor

Parts





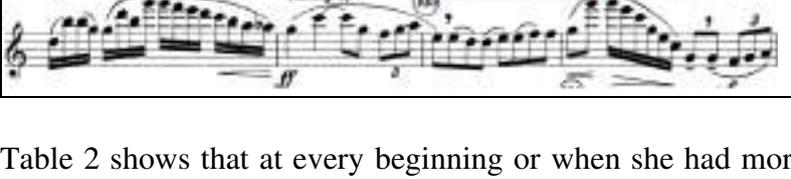
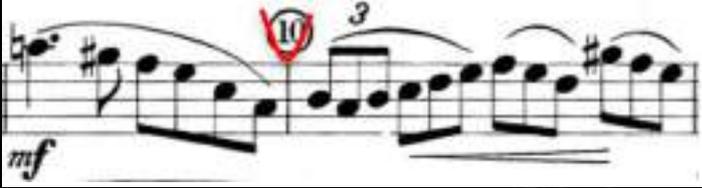
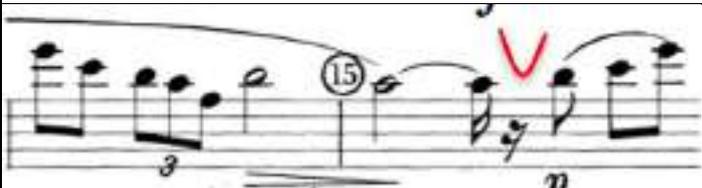



Table 2 shows that at every beginning or when she had more than 1 bar rest, she used deep breath to gain full air. But somehow, some of the part when she took deep breath the camera only focuses on the piano player. Not only that, but this technique is also one of the hardest to over serve since it produces less sound when inhaling deep air. However, it has been confirmed that, according to Galway (1982), he mentions that deep breath is a breath where flute players take before beginning of repertoire or in a handy couple of bars' rest.

4.3.2 Bridge Breath

Table 3 shows the breathing point that Jana Jarkovska took when performing this repertoire.

Parts	Bar
	5
	9
	11
	14
	15
	19
	27
	36
	37
	39

 <p>43</p>	
 <p>47</p>	
 <p>48</p>	
 <p>49</p>	
 <p>59</p>	
 <p>60</p>	
 <p>61</p>	
 <p>64</p>	
 <p>65</p>	
 <p>68</p>	



Table 3: Bridge breath place that Jana Jarkovska took

Bridge breath is one of the most frequent breaths that will be taken flautist to simply get enough air when practising or performing. The factor that Jana Jarkovska took this frequently is because it is the easiest type of breath we can take anywhere. Other than that, the note value, before and after she took bridge breath is also slightly longer compared to quick breath. For instance, most of the examples from table 4 only have a quaver or bigger note when she took bridge breath.

Conclusion

In summary, each woodwind instrument or specifically flute player applies the same breathing technique but it depends on their air capacity and the understanding of the breathing technique. Beginner players might have less air capacity because of a lack of knowledge in the field of breathing techniques and are still in progress to expand and develop the breathing component. Flute players should understand the quantity of breath, the control of it, and the economic use of it. Thus, mastering breathing techniques and understanding the breathing concept is crucial to be able to perform musical pieces very well and be enjoyable. For instance, according to Bayley (2002), when students understand the concept of breathing and apply it in their playing, it will give them benefits. Jana Jarkovska is a young Czech leading flautist who is majoring in the classical music genre. In her playing for this repertoire, Concertino for Flute and piano, she shows that she has a really good knowledge and skills which is knowing the amount of breath that she needs until the next breathing point. Not only that, but she also has good control of the airspeed needed for each note and she uses the air depending on its needs.

Besides that, Jana Jarkovska also has been utilising three types of breathing techniques which are a deep breath at every beginning of a section or when have longer rest, bridge breath which is mostly used in between phrasing or in the middle of phrasing, and quick breath, especially in the fast passage. This shows how she applies the breathing technique and understands the concept of breathing to enhance the performance. This repertoire is one of the most famous among flautists as an examination repertoire. Thus, the findings of this study will benefit not only a student who is currently learning this repertoire but also help a student who wants to gain knowledge regarding breathing technique in flute playing to help them improve their playing. Not only that, but another wind instrument can also benefit from this study since the breathing technique is not only for the flute player.

For future researchers, there are a lot more breathing techniques that can be traced and for instance, the Alexander technique focuses on many types such as belly breathing, breathing exercise, etc. There are also some other extended breathing techniques such as secular breathing. Other than that, repertoire selection also should pick on repertoire that is composed to challenge breathing. Debussy is one of the composers who composed a repertoire that challenged the ability to hold long breaths. To give an instance, Syrinx or Prelude to the Afternoon of a faun is a good choice for holding a long breath. Furthermore, the selection of



video performance is also important. We suggest finding video performance that has only one view from the beginning until the end so observation can be done more accurately since it can be seen clearly. Lastly, we recommend future researchers choose video performance that has clear audio so observation can be done more effectively.

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