THE DEVELOPMENT OF THE MUSICAL FEATURE OF SAW BANG

Kotchasi Charoensuk¹, Narongruch Woramitmaitee²
¹Ph. D. student, College of Music, Mahasarakham University, Thailand.
²Asst. Prof., of College of Music, Mahasarakham University, Thailand.
²narongruch.w@msu.ac.th

ABSTRACT

This article aimed to 1) study Saw Bang musical features and 2) develop 4 sizes of Saw Bang consisting 4 scales based on western music theory. The findings were as follows.

1) Bang was made from Pai-Hia or Pai-Sang bamboos, sharpened not exceed than 60%, originally standard sizes for Soprano and Alto while using “Nan” bamboo for Tenor and Bass to produce sound similar to original one. 2) The original string tree made out of cotton robe was the best because cotton was soft and easily attached to chest. However, materials did not directly affect sound production. 3) Bridge was and tightly attached to Bang with wood glue to transfer more effective vibration. 4) For strings, (1) Violin strings 1 and 2 were used for creating Soprano, (2) violin strings 3 and 4 for Alto, (3) Cello strings 3 and 4, and (4) double base strings 1 and 2 for Bass. 5( Tuning keys were made of wood to reduce limitations of bamboo sizes. 6) Ngong was made from bamboo as locally available material and bow from horsetail due to its toughness. 7( The original sound hole is effective to make sound, however bigger size can be more effective.

Keywords: Saw Bang, Wooden Saw, musical feature of Saw Bang

I. INTRODUCTION

MUSICAL instrument is an art that reflects the cultural progress. It is one of the symbols along with the culture that helps support the rituals of the community to be more sacred. It helps to bring about unity of faith. Jumpop Panthip Foundation, 2020( The sound and rhythm of the music is produced by the instrument that mediates the sound. The music players will use the method of percussion, flip, color, beat, blow to make the sound that comes out in relation to the ongoing ritual. For folk music, it is music that expresses feelings as well as the beliefs and temperaments of the villagers.

Folk music instruments can reach and dominate the hearts of people more than any other type of music because the identity of the content of folk music is both educational and entertaining. The important thing is knowledge of the world and the Dharma. It is a teaching and training for people to behave in beautiful things )Chonpairote, 1983: 10). In his spare time from farming Isan people will prepare musical instruments made from everyday utensils or local materials brought together to play on various occasions Both work, merit, tradition and recreation. There are 2 types of games in Isan traditions and rituals: 1) ritual games refer to the players and participants in the event will be in the atmosphere of the sanctity of the ritual and 2) recreational play means to join the game with joy, relieve anxiety and enjoy playing rather than solemnly focusing on the ritual )Mosikrat, 1988: 13).

Bamboo Saw is a traditional Thai-Isan musical instrument that has a long history since ancient times inherited from one generation to another. It is a folk instrument that can be easily produced by people in the community. It is popular to play for fun as activity in the community. It can be played both solo and in an ensemble with various kinds of instruments such as Kaen, Teng (harp), cymbals, cymbals, and folk xylophones beautifully. This instrument, inherited from a music teacher from Laos, is not clearly documented )Laokonka, 1015: 66).

In the past, the Saw Bang used to be a popular instrument among folk artists which has been used together with other folk instruments widely. Saw Bang has been used to play in the village traditions. Performance at various
festivals or even religious traditions called Saw Mai Pai in local dialect; some scholars call it Saw Phu Tai. The Saw is a musical instrument that is particularly interesting as it is a stringed instrument. Saw Bang is a musical instrument made of bamboo in which the skin is peeled off until a thin bamboo tube remains. Then drill a hole to create a sound cavity. Take two lines along the length of the bamboo poles. Differences in the characteristics and types of bamboo species and methods of fabrication will affect the sound characteristics, quality of sound, melody, resonance, loudness, and durability of the Saw Bang. As being regarded as a unique musical instrument, it is different from the other types of Saw found in the Isan region and as well as in other regions. In addition, the playing and playing methods are different from other types of Saw in general.

Under the context of the modern world that is full of foreign cultures where the spread the culture of making Saw Bang in Thailand, it is critical because there are fewer acquaintances and inventors. Most of the inventors were elderly and lacked a successor of music culture in this field. Only a small number of elderly people were aware of and had experience in crafting and playing Saw Bang. Consequently, it is possible that the culture of making Saw Bang may be disappeared in the future. In order to consolidate the aforementioned music culture as well as to develop the form of the invention of Saw Bang to be better known under the style of contemporary culture which is a combination of ideas of one's own culture and outside culture transmitted into a new culture that is in line with the current social context to contemporary culture to be more international. Therefore, the researcher is interested in studying the guidelines for the development of musical characteristics of the Saw Bang which will study the characteristics and development guidelines for the invention of sorbet in a conservation way to contemporary Thai way of life. In order to develop the music culture of Saw Bang to be remained in the society in the present era.

Objectives of the research

1) To study and develop the musical feature of Saw Bang.

2) To develop 4 sizes of Saw Bang consisting 4 sound scales based on western music theory.

II. RESEARCH METHODOLOGY

1. Population and samples

The research entitled “the development of the musical feature of Saw Bang is the qualitative research. The population were selected by using purposive sample technique and then inclusion criteria was implemented to specify the qualification of the samples who were 1) aged from 18–80 years, 2) able to read, listen and write Thai and 3) consent to participate in the research. The samples were also divided into 3 groups as follows.

1( Group of knowledge participants: a group of informants to provide depth information and content regarding history of folk music. This group of informants comprised academicians and folk musicians residing in Phu Hor sub-district of Phu Luang district, Dansai sub-district of Dansai district, and Pak Tom sub-district of Chaing Khan District in Loei province.

2( Practitioners. The participants in this groups are responsible to play music, musicians or those who were trained to transfer knowledge of folk music who were famous people and honored to play music in special traditions or special events assigned by the government sectors or local sectors in Phu Hor sub-district of Phu Luang district, Dansai sub-district of Dansai district, and Pak Tom sub-district of Chaing Khan District in Loei province.

3( General Informants. This group is consisted of 10 informants who were interested in folk music, music audience and local people residing Phu Hor sub-district of Phu Luang district, Dansai sub-district of Dansai district, and Pak Tom sub-district of Chaing Khan District in Loei province.

The researcher undertook to keep the information of the interviewees confidential and does not publicly disclose name or personal information individually. The results of the research will be presented in the form of an overview that is a summary of the research results for academic purposes only and the relevant data will be destroyed after the completion of the research.
2. Research tools

2.1 The research tools comprised interview and Focus Group Discussion created by studying from books, theories, thesis and other documents as well as related research works as guidelines for creating the research tools. The research tools for this research study were classified as follows.

2.1.1 Structured Interview. The researcher studied textbooks, concepts, theories, thesis, academic documents and related research as a guideline for creating questionnaires. by collecting data to develop the musical characteristics of the zobongs in the area of Phu Hor sub-district of Phu Luang district, Dansai sub-district of Dansai district, and Pak Tom sub-district of Chaing Khan District in Loei province. The questionnaire on the development of musical characteristics of the Saw Bang that the researcher created was divided into 4 parts as follows:

Part 1 Interviewing for personal information of the participants including gender, age, education and occupation.

Part 2 Interviewing for physical feature of Saw Bang. The content was divided into 3 topics: Feature of Saw Bang, materials for making Saw Bang and how to make Saw Bang

Part 3 Interviewing for the data regarding the development of musical feature of Saw Bang. The content was divided into 3 parts in clouding problems and obstacles regarding efficiency of Saw Bang, how to develop Saw Bang, and opinion and suggestions.

2.1.2 Focus Group. The researcher used group discussions to visualize the involvement of community people who shared opinions and analyzes on various issues regarding participation in the creation and development of Saw Bang.

2.1.3 Observation. Participant Observation was applied for investigating general context of the community, tradition and activities in communities. Different data collection methods as well as observation were performed together while collecting data base on the situations experiencing during data collection process.

2.2 Spectrum Analyzer. The researcher set up an audio spectrum measurement device which consisted of an RTA Superlix ECM999 microphone, a Tascam US-1x2 audio transceiver, and an audio analyzer computer to analyze the sound characteristics and the pitch of Saw Bang development.

III. DATA ANALYSIS

Physical feature of Saw Bang

Saw Bang was made from bamboo tube with a length of 1-2segments, the overall length of about 50-60 centimeters, with a diameter of about 5 to 8 centimeters. A hole was drilled to create a sound cavity in the back. There are two cords strung along the length of the bamboo poles. The top has tuning keys for setting up the strings. The strings were made of bicycle break lines used in everyday life. The bow was made of bamboo and horsetails, tendons, ropes or vines, approximately 40 centimeters long. It is a musical instrument that produces sound by vibrating the strings by using a horse's tail to match the strings of Saw Bang. Then the vibration passed through the bridge into the barrel that serves to roar the sound to make a loud noise. The sound produced is amplified by a characteristic width measured by the hole diameter at the front or back of the fiddle. Saw Bang has a unique sound. The color of the sound in the flapping of the wood mixed in the sound. When played, it produces a dry, low-pitched sound. The parts of Saw Bang are illustrated in Figure 1.
Obstacles and problems to the performance of Saw Bang

1. Bang or bamboo tube is used for making Saw Bang. The use of bamboo for making generally causes problems in sharpening. If the wood is too thick, it will be more difficult to estimate the thinness and easy to make mistakes. Also, thick bamboo produces a sound that doesn't resonate as it should and has much weight. Sharpening the can cause bamboo broken, weaken and bent at some point. In addition, sharpening can be the risk of unsuccessful sharpening because if there is an error in the last sharpening point, the whole bamboo will be unused.

2. String trees. The invention of Saw Bang in the original form used thread or rope as a material for tying, about 1-2 cm below the top bark cuff. String trees play a role in creating vibrations to the string of the Saw Bang. If it is not tight, it will affect the sound production efficiency of the Saw Bang.

3. Bridge. A small-sized bamboo is sharpened into a thin shape, with curved base along the bamboo tube by sharpening the base to have a curve touching the bamboo chevron at two points. The top was notched with 2 small holes about 1 centimeter apart so that the strings will not move away. The researcher found that the original bridge construction had a defect at the base of the bridge which had a base as a small contact point with only two points and the base also has a surface that is not close to the surface of the Saw Bang body, resulting in poor transmission of vibration from the string to the sound cavity of the Saw Bang, resulting in a low-pitch sound.

4. String. The strings the villagers used to make Saw Bang are commonly made out of bicycle brakes since it is a local material that can be obtained by unfolding it to obtain a thin wire, the surface of the wire is rough, causing the sound of vibration with the paint quite well. However, it still produces a sound that is not very loud.

5. Tuning keys. Traditionally, bamboo was sharpened into a round shape. The tip looks like a small hole punched for hanging Bang Saaw at the end. It was found that the tuning keys were originally made from bamboo. If it is not sharpened, contact surface of the body and the knob insertion hole of the Saw is uneven and does not have a slope gradient of the surface until it looks like a wedge that fits when it is used often loosens up. In addition, according to the aim of the researcher to experiment with the invention of a large tenor and bass Saw Bang, it was needed to try using the strings of the international stringed group Cello and bass (Bass), which is a large string. Using bamboo to make tuning keys needs large, thick bamboo, which is rarely available. In addition, the wood of bamboo has a longitudinal rough line, suitable for tensile loads rather than forces acting from the side. When stringing large metal universal strings and adjusting tension, the bottoms can be easily broken.

6. Ngong. The traditional one was made of bamboo. The strings of the bows can be made from various materials such as horsetails, string ropes, hemp ropes, hemp ropes, and vines. Villagers use strings to make bow strings because they are readily available locally. The use of strings to make the strings of such bows is not very effective because the strings are glossy and slippery, resulting in less vibration.

7. Sound Hole. Chisel or sharp stick is used to drill a hole through the bamboo joint at the top of the joint so that the sound can be dispersed through the top. If a drilled hole drilled is too small, it will make a low sound.

The development of musical feature of Saw Bang

The researcher has studied the solutions to various problems in the crafting and strengthening of Saw Bang after obtaining a complete prototype of a Saw Bang, an experiment was carried out to increase the size of the saw bang by three sizes. Then, a pattern of strings suitable for each size of Saw Bang to get the best sound were investigated to be able to develop Saw Bang with strings producing 4 sound scales by using the principle of grouping the sound frequencies of the stringed instruments such as Violin, Viola, Cello and Bass to get the full sound. The 4 strings that have never been invented before consisting of soprano, alto, tenor, and bass choirs in harmony with universal music theory to bring together the ensemble for a contemporary folk song recompiled in the future which can develop the musical characteristics of Saw Bang as follows.
1. **Bang or bamboo tube.** The standard sized Saw Bang created by villagers has a length of 50-60 centimeters and a diameter of about 8-12 centimeters. Soprano and alto standard sizes should be used for best results because when comparing the thickness of the wood with other bamboo species in the same diameter. Such bamboo species have a thinner body above the base of the trunk to the tip than other bamboo species. Especially the bamboo is the thinnest wood. Pai Hia, a type of bamboo, has the segment lengths ranging from 60-120 centimeters. Bamboo segments lengths ranged from 50-70 centimeters. The diameter of the two types of bamboo is from 8-12 centimeters, which can be used from segments of bamboo. Above the base, about 25% of the total length of the trunk is made to make a sarong with a length 60 centimeters, both sizes are suitable.

For large-size Saw Bang, the researcher found that the invention of this size of Saw Bang was best used by giant Nan bamboo. Nan bamboo is a bamboo originated at Doi Tiu, Tha Wang Pha District, Nan Province. It has a large trunk with the diameter of around 30-45 centimeters. In order to divide the parts of Saw Bang, the researcher will use the middle part at the bottom, about 60% of the total length of the Bamboo tube which obtain thin texture but still have a diameter of about 20-25 centimeters. The length is used to create a bonsai that has a sound frequency range of 120 centimeters in the international stringed instrument group Cello (Cello). And the length of the invention of the frequencies are characterized by the sound frequency range in the bass instrument group (Bass) 200 centimeters for musicians to play by standing.

The reason for choosing thin bamboo tube is to reduce the problem caused by sharpening the bamboo tube. If the wood is very thick, it need more sharpening, making it more difficult to estimate the thinness and easy to make mistakes. Also, thick bamboo produces a sound that doesn't resonate as it should and has a heavy weight.

Sharpening the outer surface of the Saw Bang started by barking to remove the surface and make it thinner from the top part down to the bottom base and gradually shrink to get the average thickness about 0.5 centimeters. The surface area to be fixed with the bridge of the Saw Bang must be thin, similar to the others to receive vibration from the bridge or the sound. From the experiments of the researchers found that it can be sharpened half at the front part of the tube, not more than 60% of the circumference of the tube. Saw Bang can also vibrate to produce the same sound. By sharpening the original samurai, the sound pressure is -24.4dBFS, and the half-barrel sharpening can measure -26.1dBFS, resulting in not much difference in sound reproduction.

This sharpening method reduces the strength of the Saw Bang. Originally, having to sharpen to some extent may cause the cylinder to break, weaken and bend at some point. In addition, sharpening the wood around the tube is risk having unsuccessful sharpening. Even there is an error in the last sharpening point, it we have to lose all the bamboo tube. Sharpening the half of the bamboo will make the part of the wood on the back that has not been sharpened completely act as the main frame of the Saw Bang making it stronger. It reduces the risk of mistakes when sharpening around the tube and is also able to drill multiple sound holes to amplify sound on the back of the unsharpened wood without breaking the wood (See figure 2).

![Figure 2: The comparison between sharpening half and overall bamboo Bang](Image)

Source: Researcher
In sharpening, the concept of villagers’ visual predictions is still implemented by sharpening the bamboo during the day when the sun is strong, drilling holes at the top of the bamboo then gradually sharpening the bamboo thinner and shiny with the sunlight to see sunlight plastered through the wood into a moderate red light. Then, expanding the holes drilled at the bamboo joint at the beginning as equal as the inner surface to better serve as a hole for making sound to the outside.

2. Nuts. From the experiments, it was found that traditional rope garter works best because the cotton rope is soft and easy to tie the chest tightly. As for the use of tendon ropes, it has better results in terms of strength, but it is more difficult to tie the garter because of the stiffness of the tendon rope. In addition, the researcher has also tried using metal wire to tie the garter with better results. String and cotton rope, but metal wires are more difficult to tie as they are more flexible and less resilient and, when tightening, are more likely to cause damage to the serpentine than string and cotton rope. However, the use of garter material does not directly affect the sound reproduction efficiency of the Saw Bang.

3. Bridge. The researcher found that the original cable bridge construction had a defect at the base of the bridge which had a base as a small contact point. with only two points And the base also has a surface that is not close to the surface of the Saw Bang body, resulting in poor transmission of vibration from the string to the sound cavity of the Saw Bang, resulting in a low sound. From the experiments of the researchers found that this problem can be solved by building a bridge to have a base attached to the ribs along the line by polishing the base of the bridge to have the most contact with the body of the Saw Bang. Then wood glue was applied to install the cable bridge to make the cable bridge stronger and more closely attached to the serpentine body. The glue itself acts as a medium to penetrate through the gaps of the small wood splinter surface between the base of the bridge and the Saw Bang body, it can transmit vibrations better as well (See Figure 3).

![Figure 3: Comparison between original and developed bridges](source: Researcher)

4. String. The strings that the villagers used to create Saw Bang originally is from bicycle brakes since it is a locally available material and the surface of the wire is rough. It produces sound by vibrating. The researcher has conducted an experiment on Thai stringed instruments. International stringed instruments and cables are made of other synthetic materials in the local area according to the research scope specified. According to the scope of the research, the researcher’s selection is based on the probability and physical characteristics between the size of the string and the size the most appropriate and compatible. Then, a Spectrum Analyzer was used to measure the sound pressure level and the sound wave level of each size of Saw Bang that were tested with different types of strings to divide the loudness and frequency bands in order to analyze the sound frequencies and compare them with conventional bore material. It can be concluded as follows.

To select strings to make a good Soprano, the first and second strings were suggested as they can reach the loudness level of the first string -15.2 dBFS. The second string has -21.1dBFS, and the 1st string has the dominant band in the frequency range from 4kHz to 16kHz, and the 2nd string has the dominant band in the 1.5kHz range, up to 8kHz, which is the frequency close to the sound of instruments in the violin or the sound line closest to the Soprano sound.

The selection of strings to make a good alto Saw Bang, the best way is to use the 3rd and 4th strings as they can read the loudness of the 3rd string -28.3dBFS. The 4th string has -27.5dBFS, and the 3rd string has a dominant frequency
band from 250Hz to 6kHz, and the 4th string has a dominant frequency band in the frequency range from 200Hz to 6kHz, which is the closest to the viola or alto sound.

Selecting a string to make a sabot in the tenor string should be effective, it is best to use the 3rd and 4th cello strings because they can read the loudness level of the cello strings. The 3rd string has -18.5dBFS, the 4th string cello has -16.0dBFS, and the 3rd string cello has a dominant frequency range from 63Hz to 3kHz. Fourth, the dominant frequency band ranges from 200Hz to 3kHz, which is the closest to the cello or tenner sound. For selecting the strings to make effective bass the 1st and the 2nd double bass string were used because the loudness level of the 1st double bass string can be read. -17.3dBFS. The 2nd double bass has -17.6dBFS, and the sound wave level of the 1st double bass has a dominant frequency band from 31.5Hz to 3kHz, and 2nd double bass has a dominant frequency band. In the frequency range from 31.5Hz to 3kHz, these are the frequencies that are closest to the sound of double bass instruments or those that are closer to the bass string.

5. Tuning keys. The problem of crafting tuning keys can be solved by using hardwoods obtained from perennials with fine wood to be sharpened. The use of such hardwoods allows a wide variety of large pieces of wood to be used to create large tuning keys. This reduces the limitations in the size of the bamboo used to make the tuning keys and defects in the strength and texture of the bamboo.

6. Ngong. From the experiments of the researchers found ponytail is the best material for making bow because horsetail has a natural roughness and toughness. When applying to the strings of the Saw Bang, it will create a lot of vibration, causing a loud noise. The bow itself uses bamboo to create the best results in the traditional way since it is a material that is easy to find locally and its flexibility and sound effect are satisfying.

7. Sound hole. From the experiments, it was found that drilling the sound holes as originally traditional method is already effective. However, if the size of the hole is enlarged, it will be more effective. Also, the fiddles in the tenor and bass lines need to be inserted in the middle of the fiddle from behind. The researcher therefore maintains the sound hole condition according to the aforementioned pattern so that the strings can be inserted.

The developed Saw Bang

1. Saw Bang for Soprano Sound. It is created into a shape of 8 centimeters in diameter, 70 centimeters long, using the method of sharpening half of bamboo tube. The 1st and the 2nd strings of the violin were used in crafting using dual tone setting method, 5 Perfect as a La sound. The first string that is counted (inner string) is set as a la tone. It is used as the main vocal string of the vocal group or Drone as a gradation string for different volume notes. The 5 pairs of strings are designed similar to the sound system of typical Isaan Saw Bang in order to be able to play with folk songs appropriately. This style of stringing is commonly used for playing Isaan folk songs in general.

2. Saw Bang for Alto sound. It has a diameter of 12 centimeters, a length of 80 centimeters, using the method of sharpening half-cylinders of bamboo. The 3rd and the 4th strings of the violin were used in crafting using the dual tone setting method. For La, the first string that is counted (inner string) is set as La tone. It is used as the main vocal string of the vocal group or the Drone, used as a gradation string for different volume notes. The 5 pairs of strings are designed similar to the sound system of typical Isaan Saw Bang in order to be able to play with general folk songs appropriately.

3. Saw Bang for Tenor sound. The size is 22 centimeters in diameter, 120 centimeters long, by sharpening half of bamboo tube using the 3rd and the 4th cello strings to craft by setting the 3 Major duo tone as the sound. The first string which is inner string will be set as the tone. It is used as the main vocal string of the vocal group or the Drone as a gradation string for different volume notes. The aforementioned dual 3 cabling has a unique feature in order to be able to adjust the tension of the Saw Bang strings not too tight and can be appropriately played with general folk songs.

4. Saw Bang for Bass sound. The size is 25 centimeters in diameter, 200 centimeters in length, using the method of sharpening half-cylinders of bamboo. The 1st and the 2nd double bass strings are used, setting the 3 Major duo tone as the sound. The first string that is the inner string is set as the tone. It is used as the main vocal string of the vocal group or the Drone. Used as a gradation string for different volume notes. The aforementioned dual 3 cabling
has a unique feature in order to be able to adjust the tension of the Saw Bang strings not too tight and can be appropriately played with general folk songs (See figures 4 and 5).

Figure 4: The Developed Saw Bang

Source: Researcher
IV. CONCLUSION AND DISCUSSION

Conclusion

The research entitled the development of the musical feature of Saw Bang is a qualitative in which the researcher studied and analyzed according to the process of anthropological studies. The issued studied included the features and the approach to the development of Saw Bang in conservation to the contemporary Thai way of life which is consistent with the concepts and theories of anthropological studies by Narongrat Woramitmaitri (2017): 58-59, Sukree Charoensuk (1995: 38-41), Panya Rungruang (2003: 1-2), Merriam (1964: 23), Anan Nakkong (1995: 5), Nettl (1964: 34) that this method allowed researchers to selectively define areas as data sources for data collection. All primary data is obtained from the individual whereas the secondary data is the related information from the sourced surrounding the studied issues including the study of history, musical feature, physical characteristics of musical instruments, sound systems, etc.

Saw Bang is a musical instrument that produces sound by vibrating strings by using a colored ponytail to match the strings of the bridge. Then the vibration will pass through the bridge that serves the sound to make a loud noise. The sound produced is amplified by a characteristic width measured by the hole diameter at the front or back of the Saw.

Developing the characteristics of Saw Bang through the use of creativity to combine various fields of knowledge gained from experience and connected to new situations until being able to develop materials and modifying invention methods to solve problems because the original Saw Bang is not strong and easily broken. It also has a soft sound and there is a problem with adjusting the volume. The development of this feature led to the invention of soprano, alto, tenor, and bass sounds. Consequently, the researcher needed to create Saw Bang in accordance with the style of international music in order to combine the band for playing contemporary folk songs for Saw Bang as Kochasri Charoensuk (2018: 40) explained that instruments with different sound sources had their own unique sound. According to the mentioned principle, the sound wave characteristics of an instrument can be detected using a sound wave level instrument by considering the sound waveforms measured by that instrument. The Spectrum Analyzer is used as a scientifically proven reference tool by displaying a graph that divides the frequency bands according to different types of instruments into different frequency bands based on the grouping of instrument frequencies for tuning in a recording system. In which the invention of Saw Bang according to the objectives of the researcher can be summarized as follows:

Bang or bamboo tube. For Saw Bang, Pai Hai or sang bamboo to craft standard sized Saw Bang according to the villagers’ soprano and alto sounds. Meanwhile, the Nan Bamboo was used to create fiddles in tenor and bass tones which can sharpen only the front part of the wood half-cylinder, not more than 60% of the circumference of the tube. Saw Bang can vibrate to make as good sound as sharpening the original style, and making it stronger.

For most effective string trees, cotton was suggested in the original form because the cotton rope is soft and easy to tie the chest tightly. However, material does not directly affect the sound reproduction efficiency of Saw Bang.
In addition, bridge of the Saw must be tightly attached by polishing the base of the bridge to have the most contact with the body of the Saw Bang. Then, apply wood glue to install the cable bridge to make the cable bridge stronger and more closely attached to the body. The glue itself acts as a medium to penetrate through the gaps of the small wood splinter surface between the base of the bridge and Bang body, it can transmit better vibrations. For strings, the 1st and 2nd strings of the violin were used to make Soprano Saw Bang, the 3rd and 4th strings of the violin were used for creating Alto, the 3rd and 4th cello strings were used for producing Tenor, and the 1st and 2nd double bass strings were used for creating Bass. Meanwhile, tuning keys were made by sharpening hardwood obtained from perennials. The use of such hardwoods allows a wide variety of large pieces of wood to be used to create large Bang Saw tuning keys. This reduces the limitation on the size of the bamboo used to make the knobs of the large ribs and the defects in the strength and texture of the bamboo. For Ngong. It is made out of bamboo as it is readily available locally and ponytail is used to make the strings of bows since the ponytail has a natural roughness and toughness in the body, when applying paint to the strings of the Saw Bang will create a lot of vibration, causing a loud noise. Finally, for the sound hole, if the size of the hole is enlarged, it will be more effective.

Suggestions
Suggestions for further research regarding the development of Saw Bang Ban were as follows.

1. Suggestions from the research
Since this research is related to the knowledge of music culture, tradition conservation and development, and the invention of new musical instruments, this research will be useful to many agencies such as community leaders, temples, schools, universities, provincial cultural centers. Office of the National Cultural Commission Ministry of Culture should have led the research on the creation of the Saw Bang band to enhance the conservation and promotion integrated by all sectors to find ways to promote conservation and development of local community traditions as well as disseminating cultural traditions in the community in the form of integrated modern cultures for systematic development.

2. Suggestions for further research
2.1 Study the production process of Saw Ka Bang that are newly created for sale.
2.2 Study the Saw Ka Bang in other provinces in Thailand that has not yet been researched
2.3 A comparative study of the differences of Saw Ka Bang in Thailand and abroad, such as the People's Republic of China. Lao People's Democratic Republic Socialist Republic of Vietnam,

REFERENCES
3. Chontapiroj, J. )1983(, Folk Music. Mahasarakham. Department of Music, Faculty of