Study on Water Related Music Works—A Case Study in Gaomei Wetland

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Abstract: Wetland environment plays an essential role in integrated watershed management and has been studied from different perspectives ranging from ecology to tourism. However, there is still little research on the relationship between wetland environmental characteristics and music works. On the belief that music works can be part of wetland environment conservation, the present research explored the possibility to characterize wetland environments with music works. It was focus on the perception of local residents towards to a wetland in terms of music works. It was a case study in Gaomei Wetland, Taiwan, which is a coastal wetland. There are 3 hypotheses in this work: (1) there is a significant difference in the music types selected for the image of the wetland by the locals in different ages and living with different distances from the wetland; (2) there a significant difference in the music speed and rhythm selected by the locals in different ages and living with different distances from the wetland; (3) there is a preference on the music segments by the locals who are older and living closer to the wetland. Through survey conducted on-site, some interesting findings were obtained and presented in this paper.

1. Introduction
Although water environment has been studied extensively and intensively so far, the relationship between water and music remains insufficiently explored. It is a widely belief that art could reflect producer’s actual understanding to the nature world, and art works are the materialized forms of human understanding to social life [1]. Among all art forms, music is an acoustic structure form with specific spiritual connotations composed by organized musical sounds, which is a descriptive art form reappearing the facts and expressing emotions, which with powerful infections. Based on fact, music also can be an objective reflection to watershed environments[2].

Recently, a new branch research subject of musicology -- music geography has gradually emerged. This subject mainly studies the spatial distribution, change and diffusion of music styles, and divides geographical geography into units to study music phenomenon in different regions, which is the intersection of geography and musicology[3]. The existence of this subject also proves the above view that the birth of music works is closely related to the local environment, even to watershed environment.

Whereas previous research, most musicologists tend to focus on due to the differences in space climate, vegetation and human production, living activities, customs and beliefs around watershed
environments, there are obvious differences in musical varieties and styles [4]. However, there is not enough research to indicate connections between water related music works and geographical characteristics of watershed. Therefore, the study of via water related music works to explaining the geographical characteristics of wetlands and the searching for internal similar links is unique and rare.

This study will be centred on whether the composition methodology of water related music works is intrinsically related to characteristics of local watershed or not; discussing how the structural factors of music works are related to watershed characteristics, and whether the similar wetland environments have similar structural factors; and would the public associate the wetland environment and other possibilities. This study hopes to find out the interesting relationship between water related music works and different watershed environments.

1.1 Research Objective:
Scholar Bruner [5] thought: “music is not only a simple combination of sound waves but a complex composed by many controllable elements”. Structural factors including: tone (character and volume of sound sources), rhythm and beat (form composed by strong or weak position), harmony and music speed. Music works rise to intervention to auditory systems of people through structural factors, leading to reminding of audiences to achieve spiritual resonance.

For instance, the “Pastoral Symphony” of Beethoven is a typical headline-type music work, and audiences could hear clearly of featured sound sources such as birds-singing and flowing water in it. However, Beethoven thought the ‘Pastoral Symphony’ is not a painting but a music work expressing feeling of people about joys in countryside. It expresses feelings in rural life [6]. Since that, research on water related music works would indicate: I . Creation inspirations of music works are often originated from actual watershed environments; with influences from environments, music works can reflect prominent features in watershed environments in the content; II. The typical environmental features in varied watersheds have their own expression methods in music works, which give rise to resonance to audiences, reflected on structural factors of music pieces such as music styles, speed, beats and melodies.

2. Research Methodology
In order to verify the above hypothesis relations between water related music works and watershed environments, data collection and comparisons are conducted in Taiwan Gaomei Wetlands with the social survey methodology; in addition, music ontology analysis methodology is adopted to analyze and conclude features of mutual influences between water related music works.

2.1 Introduction of Gaomei Wetlands
Gaomei Wetlands is located in Qingshui Town, Taichung County, Taiwan Province, China. On December 19, 2007, the Construction Department of the Ministry of the Interior listed Gaomei Wetland as a national-level wetland. The wetland has a superior ecological environment with a variety of rare birds and endemic plants.

2.2 Basic Processing of Social Survey
Totally 38 questionnaires were collected in 3 days, i.e., the afternoon on Feb. 26th, 2019, 9:30 – 16:00 on Feb. 27th, 2019, and the morning on Feb. 28th, 2019. 3 pieces of water related music works with different music styles and speeds were played with unchanged designated track and volume. In order to reduce differences in structural factors in designated music works, the water related music works selected for the questionnaire are instrumental music works with same playing volume. The differences on music themes are classic work (Bird-singing Stream) and popular music work (Fresh Water Seaside). By taking the experimental principle of Herrington (as Table 1 shown), a scholar, for work speed definition scopes, music works with the speed higher than 62 BPM (Beats Per Minutes) are defined as fast music (Allegro) works, and those under than 62 BPM are defined as slow (Adagio) music works.
Table 1. BPM form of Bird-singing Stream and Fresh Water Seaside.

| Music Speed | Music work          | BPM |
|-------------|---------------------|-----|
| Allegro     | Bird-singing Stream | 63  |
| Adagio      | Fresh Water Seaside | 57  |

2.2.1 Relevant questions designed: 1. How old are you? A. 0-20 B. 21-30 C. 31-50(40%) D. over 50
2. How is distance from your home to Gaomei Wetlands? A. Less than 2km B. Between 2km and 5km C. Between 5km and 25km D. Over 25km
3. Which of the following three music segments do you think Gaomei Wetlands matches?
A. Bird-singing Stream  B. City Rhythm  C. Fresh Water Seaside

2.2.2 Descriptive on basic information of samples: By analyzing the investigation results, among the 38 respondents, the proportion of females is slightly higher than males, 55.26% and 44.74% respectively. With respect to occupations, the proportion of company staffs achieves 39.47%. With respect to the designated music works in the questionnaire, option B ‘City Rhythm’, which is selected for once, and it not taken into the analysis ranges.

Figure 1. music works were selected by different age

2.2.3 Descriptive analysis of variables: According to the results in figure 1, respondents with higher ages have higher proportion in selecting the classic music works Bird-singing Stream. 76.92% of the respondents over 50 years old, which occupy 34.21% of all the respondents, select the fast music works with the classic style. However, 72.73% of respondents of 21 – 30 years old, which occupy 28.95% of the total respondents, tend to select the popular lyric music work Fresh Water Seaside. 58.33% of the respondents of 31 to 50 years old, which occupy 31.58% of the total respondents, select the popular music work. Therefore, respondents of different ages select different water related music works. Groups of older ages tend to select allegro classic music works describing twitter and stream; young people prefer popular music works showing romance and emotions of Gaomei Wetland.

According to data in figure 2, the group of distance between living place and the wetland of more than 25km occupies 47.37% in all respondents as the group of the largest proportion, and 61.11% of them select the popular style music work. However, 68.42% of the respondents of distance between living place and the wetland within 50km select the fast classic music work Bird-singing Stream. The group of Taizhong citizens with distance of 2km-5km occupies the second proportion, 21.05%, and 62.5% of them select classic music work. According to investigation results of residents of Gaomei Wetland, 75% of residents of the wetland think that the classical music work is in accordance with the image of Gaomei Wetlands. It can be seen that the water related music works selected by people with different living distances are obviously different. Residents living far away mostly choose popular music works inspired by Gaomei Wetlands, while those living near mostly choose classical music works.
Figure 2. Music works were selected by different distance

3. Music Ontology Analysis of music works

3.1 Bird-singing Stream

The inspiration for Bird-singing Stream was inspired by the representative poems of the Chinese poet Wang Wei, a Chinese national plucked string instrument, which is a Zheng instrument solo repertoire and the addition of figurines such as bird-singings and flowing water sounds. This music work belongs to programmatic music work. In the following, the key structural factors of Bird-singing Stream will be elaborated using the music ontology analysis methodology.

Figure 3. lyrics of Bird-singing Stream

The musical structure of Bird-singing Stream belongs to the parallel music structure of ABA\(^1\)B\(^1\), and each passage includes four sentences of “ABCD” structure, also known as the transforms form. This is the unique creation of Chinese traditional music [7]. In terms of musical tone, according to the analysis of figure 3 ‘melody phrases’ in this music work, it can be concluded this work belongs to G gong-mode. And according to modal chromatics analysis, it can be found that G-major modal colors belong to vivid and lively modal colors, which correspond to the vivid picture of flowing water and birds singing described by music. For rhythm tempo, in order to describe the flowing state of the stream and the richness of the biological population, this work uses a large number of dotted notes and consonant eighth notes, giving the melody a vivid and flexible sense of flowing. As to harmony, this work is solo music by Zheng instrument, which is a typical single-line melody. However, in order to enrich the sound effect, this piece creatively adds the sound of birds singing, flowing water and other ambient sounds, so that the audience can be immersed in the scene and see a vivid picture of birds in the stream.

3.2 Fresh Water Seaside

Fresh Water Seaside is performed on a single instrument with classical guitar. According to the composer, the composition was inspired by the scenery of Taichung Port Wind Power Station that near Gaomei Wetlands at dusk. In the processing of social survey, researcher had selected and played the main melody segments of the work so that this paper will use the music ontology analysis method to analyze the structural factors.
Based on figure 4, the melody paragraph consists of 17 bars, which can be divided into 4 long melodic sentences. The musical structure belongs to the 4-sentence polyphonic phrase, which mainly reflects the sense of parallelism between the phrases. The tempo of whole piece is 4/4, in C-major. As can be seen from the example of music piece, the whole melody segment belongs to partial duration. Melody phrase of this work starts at third-beat position of the first bar, and the initial emotional position belongs to the second strong position, which rendering a calm and soothing sound effect.

The first phrase (1st to 5th bar): the first phrase is a partial duration phrase, and the musical mood is plenty gentle. The arpeggio method reflects the fluctuating state of Gaomei Wetlands. In the arpeggio descending in the 4th bar added the five-degree interval performance and omitted the middle third-note to form "hollowed-out" sound. The phrase then ends in the third note of C-major, which also belongs to the stable tone of the mode and showing the peaceful sunset scene in Gaomei Wetlands.

The second phrase (5th to 9th bar): The melody of the phrase moves up from the fifth note of C-major to the highest note of the work and pushing the melody to the first climax. The third phrase (from 9th to 13th bar): this phrase belongs to the excessive music in the work. It is still a weak phrase and imitates the first phrase. The fourth phrase (bar 13th -17th): this phrase is the ending sentence. The melody notes go up in the third interval to reach the highest tone. After the work reaches its climax, a pure fourth degree goes down to the tonic in C-major and the whole melody ends.

This work belongs to C-major, according to analysis of the classical musician Beethoven [8], it is generally believed that C-major represents the color of tragedy. In this work, the using of C-major emphasizes lyrical colors. Besides, the extensive use of the third inversion of tonic chords and the emphasis on fifth tones weakens the sad colors and increases the auditory effect of calm and romance.

4. Conclusion
Basing on social survey, it was confirmed that people of different ages choose different style of water related music works. The elder interviewers who lives closed to wetlands are, the more they prefer classical style music; while the younger who are far away tend to popular music. Therefore the Hypothesis 1 has possibilities.

Interviewers of different ages and living distances also chose different speed of water related music works. People who are elder and live closer tend to choose the fast and allegro music, while those who are younger and live farther tend to choose the lyrical music of adagio. Then Hypothesis 2 is proved.

In summary, both the age of the respondents and the distance of living place to the Gaomei
Wetlands for interviewers are different, the selected music segments are different. Since the structural factors in the water related music works are different, in addition to styles and speeds, the choice of music modes and harmony are also important reference items. For instance, in the Bird-singing Stream was added lots of ambient recording sounds like birds singing and water-flowing sounds, etc. Gaomei Wetlands was listed as a wildlife sanctuary in 2004 and is home to more than 100 species of birds [9][10]. However, due to insufficient conservation of wetlands in recent years, which have had a huge impact on the life and reproduction of birds, the number of birds has decreased. The distance of living places to wetland and the young people is not familiar with the development of wetland ecological system, so they are more inclined to express the pop music of the sunset. The nearby residents or the elderly people are more aware of history for wetland ecology, and they prefer to choose classical music with active bird-singings. Therefore, important structural factors in water related music works could also resonate with audience, emphasizing the typical characteristics of watershed environment, the hypothesis 3 can be proved.

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