Mapping Content Sequence of a Chinese Primary School Music Textbook Series Based on NVivo Data Analysis

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Abstract

This study analyzed a primary school music textbook series in China based on the data processed with the tools of NVivo 12 and gradient colored heatmap. The study had four main purposes: (1) mapping the content sequence of the series; (2) describing the state of the dimensions mapped pertaining content sequence; (3) identifying merits and drawbacks based on the evidence obtained from the statistics and mapping; (4) proposing ideas to improve the content sequence for revision and discussing possible models and directions for future studies on this issue. The findings showed that (1) this series basically covered dimensions required by China's Music Curriculum Standards; (2) certain dimensions were distributed unevenly for proper content sequencing; (3) some subdimensions were heavily clustered around grades 3-4, leaving other grades neither to function beforehand as preparation nor to function continuously afterwards; (4) the content within certain subdimensions were found unbalanced for structured coverage; (5) strong points were found on smart designs sequentially for performing and skills, as well as music elements and concepts emphasized for learning music basics. The tools of NVivo and heatmap proved to be effective for testing content sequence of music textbooks.
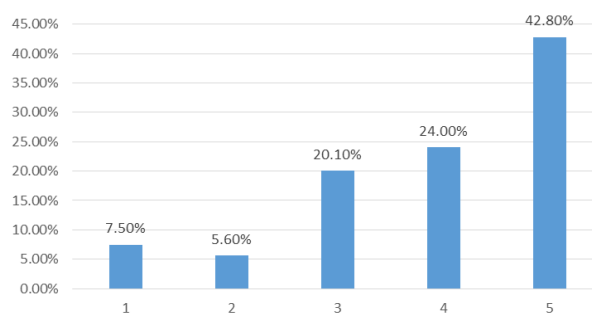
The researchers proposed ideas for better revision of the music textbooks and a preview of future studies were discussed.

Introduction: Background and Research Problem

As a common belief generally accepted by educators and textbook developers, the course content for teaching and learning should be sequentially arranged in textbooks for school children to learn without undue difficulties and frustrations. China's Music Curriculum Standards unequivocally required that "the course content should be arranged into a continuous cohesion with a sequentially complete order". (Ministry of Education of the People's Republic of China [MOE], 2011)

The ideal, however, was not necessarily turned into reality. (Zheng, 2018, p.4) The vice minister of education of China raised this comment that courses and textbooks should be developed in a way like smoothly connected "chains" but avoiding "gaps" and "bulges". By these metaphors, he was referring the textbooks casually organized, lack of rigorous watch on sequential learning. This observation was proved correctly in the case of music. According to a large-scale survey (N=15043) soliciting opinions from practitioners (Music Content Sequence Project, 2021, pp. 35-39), most informants agreed to improve the music textbooks with better sequentially organized content, avoiding abrupt encounters which they felt frustrated in teaching (see fig. 1).

1=strongly disagree; 2= disagree; 3= neutral; 4= agree; 5= strongly agree.

Figure 1. Music teachers' response to necessity for better textbook content
sequence (Source: Du, 2006)

This issue was reiterated by the latest official document that "textbooks should follow proper sequences for students to acquire steady progress in arts." (CCP & State Council Offices, 2020).

The existing music textbooks, seemingly, neither satisfied expectations of music educators, nor reached officials' ideals. In any case, for better revised music series, research is needed to identify merits and drawbacks of the existing music textbooks regarding the content sequence with the questions to be answered:

1) Does the content of textbooks properly match the music dimensions expected by the Music Curriculum Standards?

2) Are these music dimensions sequentially or smoothly arranged in the textbooks as shown by the mappings of this research?

3) What merits and drawbacks could be identified related to the previous questions 1 and 2?

4) What suggestions could be provided for improving the textbooks' revision?

Objectives

In response to the problems and the questions above, the authors conducted an analytical study on a primary school music textbook series. The objectives of the study were to:

1) map the content arrangements with reference to the dimensions requested by Music Curriculum Standards,

2) reveal and describe the existing state of these dimensions,

3) identify merits and drawbacks regarding content sequence, and

4) propose ideas for improving the textbooks.

The study would provide useful information for a better revision of the music textbooks in China with positive experiences and possible weakness located.

Literature Review

Historically, the belief of course content in a sequential manner was early expressed by Czech educator John Amos Comenius (1592-1670) in his Great Didactic emphasizing an "order" for laying out teaching materials (1967). In contemporary

music education, this principle of "order" was articulated as learning sequences in music by American music educator Gorgon (2012, pp. 76-98). One of his purposes was to organize music contents in patterns tonally and rhythmically. He pointed out that "tonal and rhythm should be sequenced on the basis of the frequency with……literature…… and comparative difficulty levels" (Gorgon, 1991, pp. 67-76). This definition, when expanded from the limits of tonal and rhythmic patterns, emphasized on music knowledge and skills to be orderly arranged while music essentials were not missing (Shu, Roongruang, &Hirunrak, 2022, p.109).

There were few cases on research analyzing music textbooks. Occasional studies touched on topics such as content coverage of "a full section of beautiful art songs, sections giving experience in choral, orchestral, ensemble music" (Landis, 1963, p.96), and creativity reflected in American music series during first half of 20th century (Nelson, 2004, pp. 187-192). Scarcity of research on content sequence of music textbooks was true in China. Twelve master theses and one PhD dissertation were available dealing with areas other than content sequence, such as a history of music textbooks (Du, 2006, pp. 67-93).

Given the situation above, a study probing into the existing music textbooks was needed. Particularly, latest research tools NVivo and "heatmap" should be employed to make findings valid, accurate and applicable.

Research Methodology

The Primary School Music Textbook Series by People's Education Press in China was chosen for analysis of this study. This decision was made because this series had been officially recognized and used by the second largest population of primary school students in China. Furthermore, the publisher is directly administered by the Ministry of Education China. For this reason, the study findings might generate more effective impacts for the better revision.

Figure 2. The Primary School Music Series Grades 1-6

(Source: Du song, 2012)

As a preliminary examination before encoding with NVivo, the contents of the series had been induced into seven dimensions:

1. Performing and Skills

2. Creative Activities

3. Styles and Schools

4. Emotions and Expression

5. Elements and Concepts

6. Genres and Forms

7. Related Culture

To exam more details under these seven dimensions, specific sub-dimensions would be identified according to the occurrences of various music-makings throughout the series, page by page, 720 pages of twelve books.

These dimensions and sub-dimensions were to be mapped and analyzed for the purposes stated earlier, possibly revealing merits and drawbacks of the series.

Data collection and analysis

NVivo 12 qualitative analysis software would be used for encoding and processing data with a gradient colored heatmap drawn to show general trends of the seven dimensions going through the grades. Further descriptions would be presented by line charts illustrating detailed sequence trends along the six grades.

Layered encoding and analysis with NVivo: (1) Encoding all the text messages including words, notations, illustrations and charts to obtain nodes for the first layer. (2) Analyzing the nodes obtained from the first layer while considering the relations between nodes, the frequencies of their occurrences; discriminating all the nodes to remove the invalid ones. (3) Summarizing general dimensions and specific sub-dimensions of the contents.

Minimizing possible bias or errors: Two professionals would provide feedbacks on questionable nodes and to delete the invalid nodes.

A definition regarding this research was tentatively conceptualized: the content sequence of the music textbook was defined, for this study, as a continuous order in which music events occurred with provision of materials and activities arranged in a gradual process for students to learn. The sequence of music textbook content was subject to inner logic of music as a school discipline and ought to be in accord with children's growth characteristics of body, mind and social-emotional aspects in particular cultural contexts. In addition, the content sequence of textbooks was, implicitly in most cases, conditioned by a philosophy of music education for every aspect.

A premise to judge content sequence in the series had been assumed that proper sequence could be horizontally observed from rows of the gradient colored heatmap for the seven dimensions and the curve lines illustrated by the charts for subdimensions. Statistics provided more detailed evidence in parallel to these two kinds of visual presentations. To be specific for a visualized description, proper sequence should be reflected in an appearance of "smoothness" while unproper arrangements of content would appear like "gaps" and "bulges" indicating abrupt occurrence shown on colored heatmap and the line charts.

Research /Findings

General dimensions

By encoding with NVivo, 2784 nodes were obtained from all the messages observed. Among them, 514 nodes were discriminated as invalid, irrelevant for including properly into the dimensions as mentioned earlier. Thus, there were 2270 valid nodes fit into the seven dimensions. Approximately, these seven dimensions covered the content frame of Music Curriculum Standards **(Refer to research question 1).**

Dimensions	Nodes	Proportion
Performing & Skills	808	35.6%
Creative Activities	120	5.3%
Styles & Schools	127	5.6%
Emotions & Expression	66	2.9%
Genres & Forms	455	20%
Elements & Concepts	358	15.8%
Related Culture	336	14.8%

Table 1. Frequencies of nodes obtained for the seven dimensions

As shown in Table 1, there were differences among content dimensions. Compared by the proportions of the nodes gained, "Performing and Skills" counted most frequently 35.6%), followed by "Genres & Forms" (20%). Relatively fewer frequencies occurred in the dimensions of "Elements & Concepts" (15.8%) and "Related Culture" (14.8%). The least mentioned in the contents were "Styles & Schools" (5.6%), "Creative Activities" (5.3%) and "Emotions & Expression" (2.9%) respectively.

These frequencies of nodes in the seven dimensions were then turned into a "heatmap" with gradient colors (Fig. 3), showing that **(Refer to questions 2-3):**

Note: The gradient colors below correspond to the different ranges of frequencies of nodes.

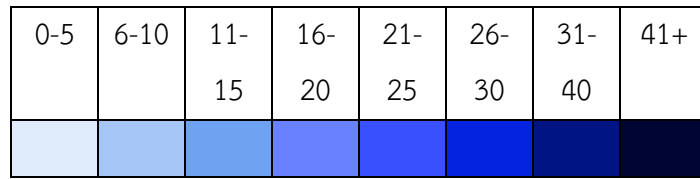| 0-5	6-10	11-15	16-20	21-25	26-30	31-40	41+

Figure 3. A "Heat map" shows dimensions' layout based on nodes frequencies
This heatmap is generated from the data collected from the formants
(Source: Shu, 2022, pp. 42-51)

(1) From grade 1 and up, one might horizontally catch an immediate look as to what extent these music dimensions sequentially or smoothly arranged.

(2) Further points might be observed on each of these seven rows. For example, the rows of "Performing & Skills" and "Genres & Forms" seemed richly emphasized while the rows of "Creative Activities" and "Emotions & Expression" were questionable because of few nodes presented now and then, presenting gaps between grades or terms.

(3) More questions than the answers lie in the dimensions of "Creative Activities" and "Emotions & Expression". One might query why these dimensions seemed less cared for the upper grades of 5 and 6.

(4) Occasional imbalances existed in rows of "Genres & Forms". In practice, such areas were not necessarily distributed evenly, though.

(5) It seemed that more emphases were placed on the basic skills and knowledge, as reflected in the dimensions of "Performing & Skills" and "Genres & Forms", colored most salient.

Specific sub-dimensions

More details were derived from the above general seven dimensions. Specific sub-dimensions were further identified according to the occurrences of various music activities presented throughout the whole series. With all the notations, instruction wordings, illustrations and charts, more concrete results were obtained from further encoded nodes which show further findings as follows **(Refer to questions 2-3).**

Limited pages did not allow all the data of mentioned nodes and their proportions reported. The findings were presented with line charts and brief words

showing the sequential trends of each sub-dimensions throughout the six grades as follows:

1. Performing & skills: Very high frequencies were found in "singing". Other sub-dimensions showed different features in each book.

1-1. Singing: The most frequent nodes occurred for rhythm. The peak values of rhythm, dynamic, breath, tempo and intonation clustered at grade 3. The lower grades were more on timbre and dynamic while higher grades on emotion.
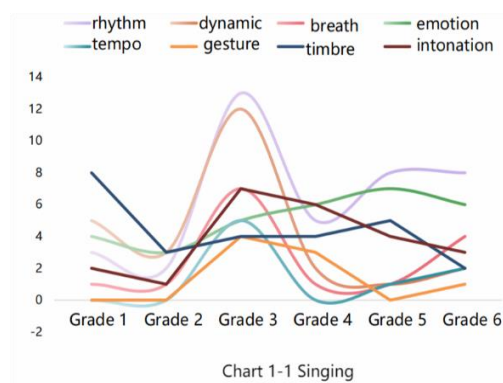

Chart 1-1 Singing

Figure 4 The chart is generated from the data encoded
(Source: Shu, 2022, pp. 42-51)

Chart 1-2 Music reading

Figure 5 The chart is generated from the data encoded
(Source: Shu, 2022, pp. 42-51)

1-2. Music reading: This activity clustered again around grades 3-4. Specific tasks could be seen in chart 1-2 respectively.

1-3. Instrumental play: The highest frequencies were of percussion, followed by wind and traditional Chinese instruments. The tasks were distributed evenly but peak value appeared once more around grades 3-4. Interestingly, lower grades were expected more for easy instruments of percussion.
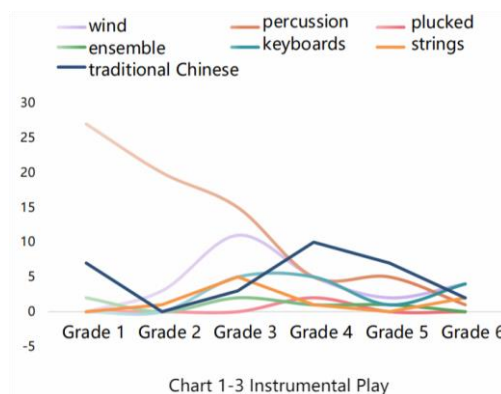

Chart 1-3 Instrumental Play

Figure 6 The chart is generated from the data encoded
(Source: Shu, 2022, pp. 42-51)
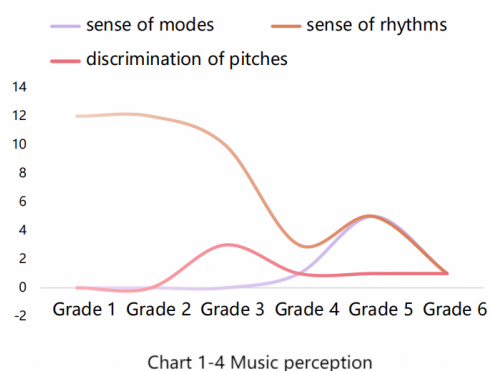

Chart 1-4 Music perception

Figure 7 The chart is generated from the data encoded
(Source: Shu, 2022, pp. 42-51)

1-4. Music perception: The sense of rhythm is highly expected, followed by those of modes and pitches in grades 4-6 and 3-6 respectively. Related with percussions for younger kids as above, one might see the intention for younger students to start with a sense of rhythm.

2. Creative activities: Included were arranging of rhythm and melody such as short songs and improvising music with dancing or moving. In grades 1-3, rhythm

arranging assumed a purposeful strategy to cultivate creativity. From grade 4 up, strangely, gradual decrease could be seen on the downward curves. Grades 1-2 kids were encouraged to improvise rhythms, movements, lyrics, with other activities added from grade 3. Melody arranging started in grade 3, closely linked with rhythm.
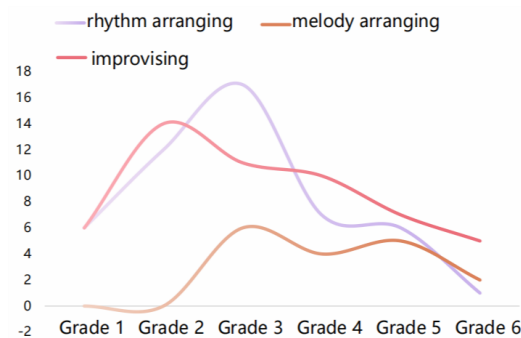

Chart 2 Creative activities

Figure 8 The chart is generated from the data encoded
(Source: Shu, 2022, pp. 42-51)

3. Styles and schools

Chart 3-1 showed Chinese music with more than half occurrences while foreign music a bit less. Most frequently counted were Chinese folk music, with much less for Chinese music of literati, new modern and early school songs.
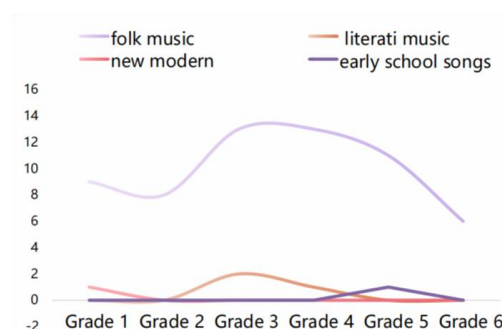

Chart 3-1 Styles and schools(Chinese music)

Figure 9 The chart is generated from the data encoded
(Source: Shu, 2022, pp. 42-51)

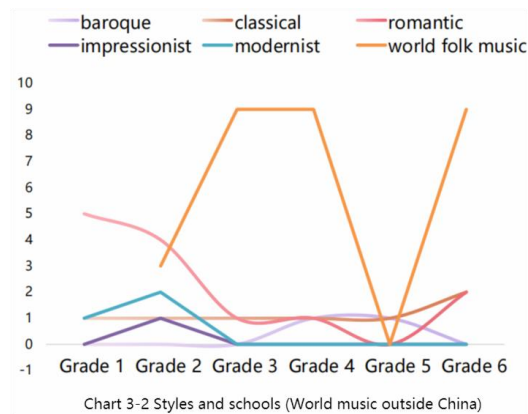Chart 3-2 Styles and schools (World music outside China)

Figure 10 The chart is generated from the data encoded

(Source: Shu, 2022, pp. 42-51)

Further divided for western music were those from Baroque to modernist. A salient feature in foreign music was on the world folk music from grade 2 to a peak for grades 3-4, then dropped to none at grade 5 and rise steeply. The charts 3-1 and 3-2 implied intentions to promote folk music, national and international, in primary schools.

4. Emotions and expression

Chart 4 presented an average distribution for this area of music which was closely related to music elements for expression. According to instruction tips in the textbooks, rich emotional response to music elements was recommended as a smart strategy to let student feel music emotionally with expressive effects by various elements.
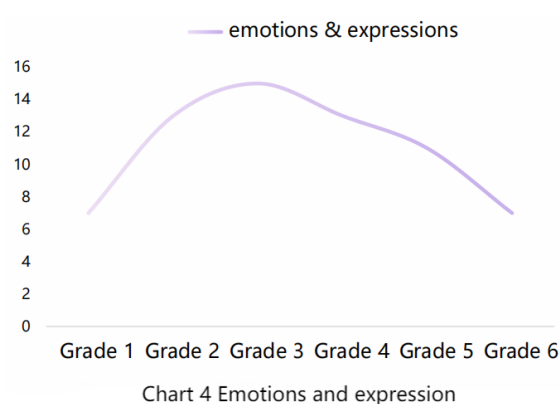

Chart 4 Emotions and expression

Figure 11 The chart is generated from the data encoded

(Source: Shu, 2022, pp. 42-51)

5. Genres and forms

Varieties of songs counted most frequently including thymes, carols, lyrics, narratives, art songs and pop. Next were dance, march, concerto, sonata, tango, polka, fugue, suite, symphony, chamber music, etc. Genres of traditional Chinese music were found in folk songs and dances, local dramas, folk instruments, etc. See chart 5.
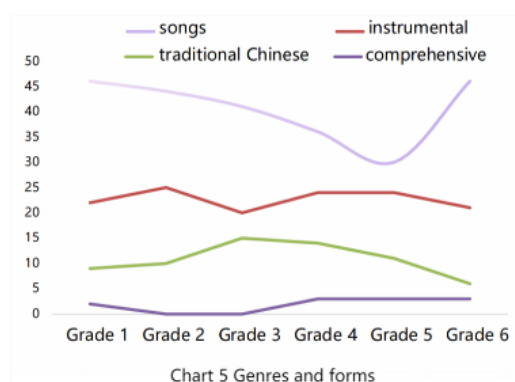

Chart 5 Genres and forms

Figure 12 The chart is generated from the data encoded
(Source: Shu, 2022, pp. 42-51)
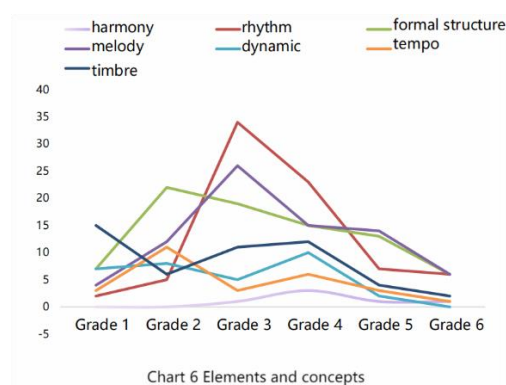

Chart 6 Elements and concepts

Figure 13 The chart is generated from the data encoded
(Source: Shu, 2022, pp. 42-51)

6. Elements and concepts

Chart six showed the details running through the grades 1-6. Viewed from the distribution, each grade focused on different elements: Grade 1 on various timbres of Nature and then to human voices and instruments; Grade 2 on the experience of dynamic and tempo with emotional meanings; Grade 3 on rhythm and beat, closely

linked with body percussion and moving; Grade 4 and up on melodic and structural patterns while learning further varieties of timbre, dynamic, tempo with other elements linked to emotions and expression.

7. Related culture

Fusions relating music with cultural dimensions were reflected in the connections involving other school disciplines and other art forms. In this dimension, the occurrence related to academic disciplines included geography, history, P. E. (sports), language and Nature. Their distributions in each grade were shown in Chart 7-1.
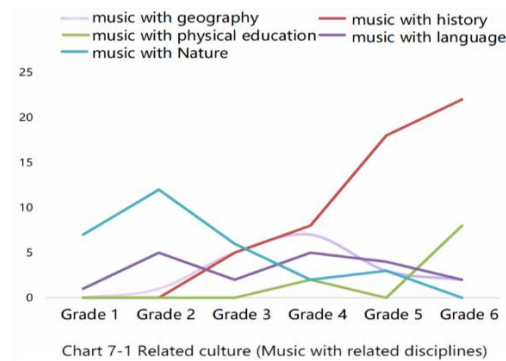

Chart 7-1 Related culture (Music with related disciplines)

Figure 14 The chart is generated from the data encoded
(Source: Shu, 2022, pp. 42-51)

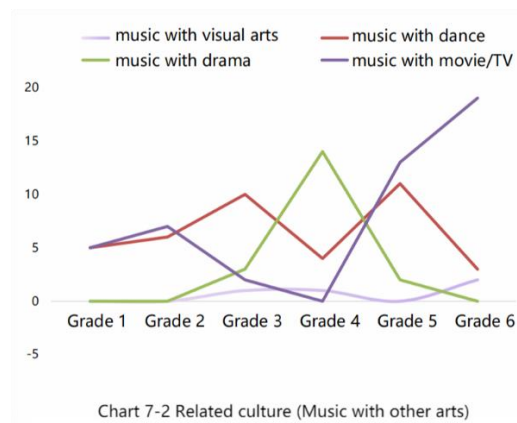Chart 7-2 Related culture (Music with other arts)

Figure 15 The chart is generated from the data encoded
(Source: Shu, 2022, pp. 42-51)

With other art forms related to music, music with movie and TV counted the highest, followed by music with dance, drama, and visual arts. See chart 7-2 for the distribution which showed a crossed up-and-down trend throughout all the grades.

Discussion

With patterns illustrated in the seven main dimensions and the derived sub-dimensions, the questions related to the research problem—the content sequence of this music textbooks series---could be answered and discussed **(Refer to questions 1-4).**

Basically, the content of textbooks covered the music dimensions expected by the Music Curriculum Standards. It could be inferred that the writers and editors of the series were aware of the Standards when designing the whole series. In certain dimensions, they went a little further in response to the latest trends of social-cultural and academic developments. Viewed from social-cultural aspects, for example, the traditional native music and multi-cultural music worldwide were obviously enriched while authentic western genres were not missing. The academic influence of the absolutist expressionism or the autonomous aesthetics was implied in the second highest distribution of music elements and concepts in this regard. Not surprisingly, the disciplinary basics of performing and skills, as a traditional paradigm, were heavily allocated throughout the series.

However, the laying out of content sequence did not fully reach the ideal of continuous order to allow music events with related materials and activities arranged in a gradual process for students to learn. In general, the "gaps" and "bulges" were observed here and there. Specifically, a large amount of content was overloaded around grades 3-4, while grade 6 was frequently left blank with much less to do. Furthermore, these undue arrangements could be identified from distributive mappings where the peak values were clustered in dimensions of performing and skills, elements and concepts, creative activities, as well as emotions and expression around grades 3-4. In fact, these might be better organized if more attentions had been paid to content ordering for an evenly running through the series. More questions than answers might be raised. When encoding certain messages through

the pages, the authors could not but fancy about a scene where the writers worked separately. Whether sufficient discussions were made among them were questionable.

Compared closely, imbalance existed among the seven dimensions and certain sub-dimensions. For instance, the dimension of emotions and expression was allocated mere 2.9% with only 66 nodes identified. As known to professionals and amateurs, music is essentially an art form full of human emotions. As an education to foster students' humanity, emotion felt in music should be emphasized. But this very nature for music education seemed neglected somehow in the series, at least not fully reflected in the instruction tips. Moreover, imbalance existed pertaining to the proportions within traditional Chinese music. Among the four categories of folk, literati, court and religious music, folk songs counted 92.3% with 60 nodes while the rest three were almost neglected.

Regretfully, the theoretic knowledge of traditional Chinese music occurred for only 4.9% which meant a serious matter regarding the reference of discourse, because the classical western concepts of music may not satisfactorily explain non-western music for students to understand their mother tongue musically and appreciate music of other cultures. Likewise, with the cultural ideologies, the sub-dimension of music perception was limited to mere senses of rhythm, modes and pitches, leaving one a culture-free impression --- a contradictable issue why differentiated perceptions for music generated from culturally different contexts were not included.

For the dimension of creative activities, more imaginative activities might be figured out and not limited to improvising with the rhythmic and melodic elements. After all, a good music education should free the students' mind and body.

Suggestion

Nevertheless, the researchers are fully aware of the limitation of this study and consider it rather as a preliminary trail because it touched merely on sequential patterns on a linear basis. Other variables such as social influence and child development should be considered by constructing a multi-dimensional model

probing into content sequence of textbooks from a wider vista. Possible design for content sequence in future studies might include a spiral model in parallel to a sequential one. That might be able to reveal more constituents for a thorough understanding into the making of music textbook series.

Conclusion

The making of textbooks is regarded by many educators as an ongoing process which should be revised periodically to catch up with the latest developments, including the proper arrangement of content sequentially. To this end, corresponding research is critical to examine the existing state on this issue. This research focused on the content sequence of a typical primary school music series in China. The researchers used NVivo 12 qualitative analysis software to process data on relevant dimensions of music. The data were then turned into the illustrative heatmap and line charts for visible descriptions. The findings showed necessity of the study with meaningful suggestions provided. Moreover, the application of NVivo and the heatmap as an illustrative tool is encouraging for research of this kind.

Ethics Statement

The permission was obtained from the chief editor of the music series at People's Education Press China, including free use of notations, instruction wording, figures, tables, illustrations and covers. And comments were openly welcome.

Disclosure Statement

The authors declare no conflicts of interest.

Acknowledgement

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