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Music Education in the Colleges and Universities of China: Current Problems and Response Strategies

Shuang Liu *

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Abstract

The increased awareness of the value of aesthetic education in China in recent years has led many colleges and universities to offer arts and music courses to meet the growing needs of society. In the case of music education, many problems are encountered of which the major one is that low efficiency of teaching. The key is to raise the efficiency of music teaching and the principal means is through the design of a comprehensive curriculum to improve the performance of teachers and students.

This study examines the current state of music education in selected colleges and universities to identify the major problems and to propose remedial strategies. Drawing on an empirical study of selected universities, an index is designed to measure the efficiency of music education. The Data Envelope Analysis (DEA) model is used to analyse the results and to find out the causes of decreasing scale returns. The design of a curriculum is attempted as a strategy to improve the efficiency of music education. Related strategies are mentioned to overcome other problems in order to raise student interest by means of modern educational and innovative teaching methods and by improving the quality of teachers.

Keywords: music education, problems of teaching, measurement of teaching efficiency, improvement of teaching

Introduction

With rapid development and improved income in China, the need to nurture talents in the arts, music and skills in cultural pursuits has become a matter of urgency. Music education is receiving increasing attention and there is a growing need for educational institutions to expand and upgrade training at the professional level. Music courses are being offered in many colleges and universities throughout the country. Some are elite universities with ample resources while others have very little. The efficiency of music education in these institutions too varies significantly. While the discrepancy in the quality teaching is a concern, the rapid expansion of music education has raised many other problems. One of these is the absence of an integrated and scientific programme in music education.

This study examines the major issues facing music education in the colleges and universities of China and explores the prospects of its development in the future. The focus of attention is concerned with the problems of music education in the general non-arts colleges and universities whose primary education and research are placed on disciplines other than the arts. It will identify the problems in music education and to suggest ways to overcome them. A questionnaire survey is conducted to obtain a proper understanding of the current situation in music education and its problems. Attempts to overcome these problems include a proposed comprehensive curriculum of music education to raise the efficiency of music teaching as well as to encourage future research on related issues.

Current State of Music Education and Its Problems

The study of music education in Chinese universities should begin with an overall understanding of the current state of development and its various problems. Some are related to poor facilities, inadequate funding, and lack of good teaching staff. The more fundamental ones are inseparable from the quality of teaching and the need for a comprehensive curriculum.

A major issue in music education is the lack of modern teaching equipment to cope with new modes of teaching (Cao, 2017). Outdated teaching facilities and equipment are being used and few institutions possess professional multi-functional studios. Some universities with advanced new media teaching equipment tend to restrict their access to students majoring in music. This frustrates efforts by the more enterprising teachers who wish to move beyond the stereotypical situation in order to stimulate student interest in learning.

Many institutions rely on a small music teaching staff who consequently bear heavy teaching load and the pressure to fulfill teaching requirements. This situation is exacerbated by the lack of professionalism in the teaching of music (Zuo, 2021). Proper training in music education is an essential element in ensuring quality teaching. But many music teachers still fall short of the

required standard to meet the needs of modern music teaching (Y. Q. Zhang, 2019). The result is the lack of motivations for both teachers and students, the former for their inability to inspire and the latter for a lack of incentive to cultivate an interest and ambition in music (T. Shen, 2016).

The right teaching methods are crucial in music education. This is confirmed in a questionnaire survey of 319 undergraduate students. They considered that some of the teaching methods are too simple and far from being able to yield good results. Some methods are outdated and rigid, and include the tendency to "cram" and fail to integrate theory with practice.

Mechanical and unimaginative teaching is inefficient and stifles inspiration (Y. Q. Zhang, 2019). Teaching that does not generate student interest and encourage student-teacher rapport will not achieve the desired teaching or learning objectives. An uninspiring teaching method does not allow students to experience the beauty of the music or to appreciate its soothing subtleness and profound depth in arousing their inner feelings and intense enjoyment.

Music is an artistic medium which promotes the cultivation of aesthetic interests, sensitivity, and appreciation among students. A fundamental weakness is that the curriculum is generally poorly planned and structured and, in some cases, even in a state of disorder. The basis of a good music education is the understanding of the students' needs and that of the overall educational objectives of the country. This is especially true in terms of the goals and needs of nurturing talents and this requires a properly planned and designed curriculum.

It is the general expectation among parents and students to place greater emphasis on education as a means of acquiring skills in a specialised field of study rather than pursuing all-round personal growth. Courses in music, art or physical education are often regarded as marginal to mainstream studies and are largely neglected. There is also a growing misconception that music and sports are studied as highly specialised disciplines and practised only by professionals. At the college or university level where music teaching is treated as a subsidiary subject, music education generally receives limited investments and resources, and teachers usually have few refresher training opportunities.

Attitudes towards Music Education

In a study of university music education efficiency by Wang Yi (2014 *et al.*) based on a questionnaire survey from a sample comprising 621 respondents (from whom 96% or 588 valid questionnaires were received) drawn from ten universities in liberal arts, the sciences, engineering, agricultural and forestry.[1] The purpose of the survey was to understand the students' attitudes, their evaluation of music education, and the current situation and existing problems of music education efficiency in the selected colleges and universities. Questions were also designed to solicit the opinion of students on the extent of their love for music; the need for music lessons in colleges and

universities; the relation between music education and music literacy and their mental development; and whether they were satisfied with music education in their colleges.

The following are some of the main findings of the study (Y. Wang, 2014, page 11):

• Love for music

The results show that the vast majority of 90% of the respondents were enthusiastic or moderate musical lovers, a tenth was rather indifferent but there was none who were completely not fond of music.

Table 1

Love for music

Option	Subtotal	Proportion (%)
Enthusiastic	259	44.1
Moderately enthusiastic	273	46.4
Indifferent	56	9.5
Do not like	0	0

• Preference for music lessons

The respondents' preference for music does not always translate into attending music lessons. In Table 2, more half of the respondents expressed a preference for music lessons, the preference of 42% was only moderate, while 2.4% had no interest at all, The reasons for this situation are worth pondering for music educators: whether the current music curriculum lacks the accurate grasp of students' music education needs, and whether the school's music education curriculum arrangement and teaching methods need to be seriously studied and improved.

Table 2

The respondent's preference for music lessons

Option	Subtotal	Proportion (%)
High preference	329	56.0
Moderate preference	245	41.7
No preference	14	2.4

• Attitude towards offering music courses in colleges and universities.

Table 3 shows that more than 90% of the respondents think it is necessary to offer public music courses in colleges and universities. It also shows that there is a great demand and expectation for good music education. As a result, it is the responsibility of schools and teachers engaged in music education to provide better music education that benefits and satisfies students' learning needs.

Table 3

Attitude towards offering music courses in colleges and universities

Option	Frequency	Proportion (%)
Very positive	273	46.4
Moderately positive	280	47.6
Not supportive	35	6.0

• The relationship between music lessons and music literacy

Formal lessons in music are generally believed to improve one's knowledge on music. Taking music lessons has a close relationship with one's literacy in music. Table 4 shows that 96.5% of the respondents believe that music lessons have highly direct or moderately direct relationship on one's music literacy.

Table 4

Relationship between music lessons and music literacy

Option	Frequency	Proportion (%)
Highly direct relationship	308	52.4
Moderately direct relationship	259	44.1
No direct relationship	21	3.6

• Music learning and mental development

The learning of music and raising one's music literacy are recognised to have a positive effect on one's mental development. Table 5 shows that 97% of the respondents believe that learning music is highly or moderately helpful to one's mental ability and alertness in thought or imagination.

Table 5

Music learning and mental development

Option	Frequency	Proportion (%)
Very helpful	280	47.6
Moderately helpful	294	50.0
Not helpful	14	2.4

• Satisfaction rate with college music education

Student assessment of college music education ranges from very satisfied to highly dissatisfied. The survey found that only 15.5% of the respondents were highly satisfied with music education of their college; 34.5% were satisfied; 40.5% moderately satisfied; but close to a tenth was not

satisfied at all. The last two categories made up half the total (Table 6). The survey would confirm that the efficiency of music education at the college and university level was low.

Table 6

Rate of satisfaction with music education

Option	Frequency	Proportion (%)
Very satisfied	91	15.5
Satisfied	203	34.5
Moderately satisfied	238	40.5
Not satisfied	28	4.8
Highly dissatisfied	28	4.8

The national educational objective is to strengthen aesthetic education and there is indeed a large demand for music education among students. But if half the student population was only moderately satisfied or totally dissatisfied with the music education that they received, this would raise serious issues of concern regarding the efficiency of music education in general.

The Efficiency of Music Education

From the perspective of educational management, it is necessary to examine the efficiency of music education and how it may be improved. The discussion here is concerned with music education of students majoring in subjects other than music and who wish to study music for its humanistic values and the cultivation of a keen sense of appreciation of music. As music education is an important component of aesthetic education and an effective means to reach large numbers of students, it is necessary to study the reform of art and music education in colleges and universities from the perspective of educational efficiency (Y. Wang, 2014).

Music education efficiency is concerned with the relationship between "teaching" and "learning," and the different attitudes and expectations of teachers and students (Y. Wang, 2014). According to the *National Physical Health Standards for Students* issued by the Ministry of Education in 2014, a multi-evaluation system was set up for arts education to improve students' comprehensive artistic literacy and to strengthen and perfect the system of arts education.

The issue of educational efficiency is not merely a matter of concern for music education but for all academic disciplines. The analysis of music education efficiency involves the examination of teaching methods and their results, a system of resource allocation that is adequate, the existence of a method of assessing the efficiency of teaching, and the design of a policy that may serve as guidelines for the promotion of the scientific development and standardisation of aesthetic education (Y. Wang, 2014).

Studies on music education in colleges and universities find that its specific goals should achieve the following objectives: basic understanding of music theory, basic perception and appreciation ability, the understanding of the development of Chinese and foreign music and famous and representative works, the understanding of contemporary thoughts on and genres of music, and the development of personal interests based on the basic performance of technical skills (Huang, 2018; Z. C. Yang, 2018).

Index on Music Education Efficiency

The concept of efficiency of music education is measured against the quantifiable input-output data of arts education. The data are from the sample that was used by the Agricultural University of China from 2007 to 2012 serving as a sample (L. Zhang, 2016; L. Q. Wang, 2019; Lan, 2016; Xing, 2018).[2]

Teaching quality affects the impact of instructions on student learning and on the economic efficiency of music education. The Data Envelope Analysis (DEA) is the most commonly used method to study input-output efficiency (Q. Chen, 2019). The DEA index is used as a model to quantitatively evaluate the level of efficiency and total factor productivity of music education. The selected factors to compute the index include variables concerning the current state of music education and the characteristics of educational inputs relating to materials, investment of time and money, teaching staff, hours of work, and use of facilities. The output variables are selected from the two aspects of "quantity" and "quality." The output index of efficiency evaluation is the sum of the number of self-compiled textbooks, scientific research projects, published papers and awards, the number of performances of art groups and the number of arts awards.

The study by Wang Yi systematically analyses and calculates the technical efficiency and total factor productivity of music education of the China Agricultural University. In order to explore and identify the relationship between the input factors and the direction of improvement, the study first examines the total factor productivity of music education, and then calculates the changes of the total factor productivity of music education and its decomposition based on the introduction and discussion of DEA-Malmquist total factor productivity and its decomposition, the selection of indicators and the explanation of data sources.[3] The combined application of DEA model and Malmquist index model not only meets the needs of efficiency analysis in depth, breadth and detail, but also makes up for the shortage of sample size, expands the analysis space and excavates the dynamic change trend of efficiency components. Its significance in this aspect has been confirmed in this research and so justifies this research. Finally, the characteristics of music education total factor productivity change are analysed and discussed.

The efficiency measurement of higher education is very complex. It involves not just one input and output, but multiple rounds and various ways of input as required by the teaching plan and the

development needs of students. The measurement index system of music education efficiency is divided into Input and Output indices. Four aspects of the Input index are human resources, material resources, time and financial resources. Its specific content includes factors such as students, teachers, teaching materials, class hours, school teaching facilities, equipment, and investment, among others. The Output index includes various achievements produced by music education and teaching, such as students' cognitive and non-cognitive skills, higher comprehensive quality brought by music education, and the income benefits and higher income obtained after employment due to the improvement of quality (Y. Q. Zhang, 2021). With reference to teachers, it also includes the improvement of teachers' quality and ability, the increase of scientific research activities and the professional performance evaluation of the school. Generally, it can be divided into talent training output, scientific research output and social service output. In the classification of the output, it is necessary to consider both the "quantity" and "quality" of the output (X. L. Wang, 2020).

DEA Model

The most basic models of DEA method are CCR based on the assumption of scale returns remaining constant and BCC model based on the assumption of scale returns remaining variable.[4] BCC is derived from the names of R. D. Banker, A. Charnes, and W. W. Cooper.[5] The comprehensive technical efficiency can be calculated by using the CCR model, and the pure technical efficiency and scale efficiency can be calculated by means of the BCC model. The product of the two models is the comprehensive technical efficiency.

The CCR model is obtained according to the following formula:

$$MAX h_0 = \frac{\sum_{j=1}^{q} u_j y_{jk0}}{\sum_{i=1}^{p} v_i x_{ik0}}$$

$$s.t. \begin{cases} \dfrac{\sum_{j=1}^{q} u_j y_{jk}}{\sum_{i=1}^{p} v_i x_{ik}} = \dfrac{u_1 y_{1k} + u_2 y_{2k} + \cdots + u_q y_{qk}}{v_1 x_{1k} + v_2 x_{2k} + \cdots + v_p x_{pk}} \\ u_j, v_i \geq 0, j = 1,2, \ldots, q; i = 1,2, \ldots, p \end{cases}$$

In the formula, h_0 is the efficiency value of DMU (Decision-Making Units) k_0; x_{jk},y_{rk} is the input and output of the K^{th} decision-making unit; u_j and v_i are weights. If h_0=1, DMU achieves both scale and pure technical efficiency, that is, comprehensive technical efficiency is effective. The second DEA model (BCC) can be obtained to measure the pure technical efficiency by modifying the parameters appropriately.

When using the DEA method to measure production efficiency, there are two kinds of measurement methods based on Input-Oriented model and Output-Oriented model to choose from. The Input-Oriented model is a mathematical programming problem to minimise the input under

the condition of constant output (H. M. Zhang, 2019). Output-Oriented model is a mathematical programming problem to maximise output under the condition of constant input. In practice, the two models can be selected based on the controllability and processability of the selected input and output indicators (H. T. Chen, 2020). No matter which guiding method is chosen, the calculation results will not be affected.

Based on the original music education input and output data, the author uploads various input and output data into the software DEAP2.1 to obtain the relative comprehensive technical efficiency, pure technical efficiency, and scale efficiency from 2007 to 2012. The results are shown in Table 7.

Table 7

The Comprehensive Technical Efficiency, Pure Technical Efficiency, and Scale Efficiency of Music Education, 2007–2012

Year	Comprehensive Technical Efficiency	Pure Technical Efficiency	Scale Efficiency	Scale Returns
2007	1.000	1.000	1.000	Constant
2008	0.930	0.942	0.988	Decreasing
2009	1.000	1.000	1.000	Constant
2010	1.000	1.000	1.000	Constant
2011	1.000	1.000	1.000	Constant
2012	1.000	1.000	1.000	Constant

Source: Y. Wang, 2014

Except for 2008, the comprehensive technical efficiency is 1.000, which is the DEA effective unit, that is, the pure technical efficiency and scale efficiency are achieved at the same time, and the scale return is kept unchanged. The calculation results of comprehensive technical efficiency show that the Arts Centre of China Agricultural University has a transition of low efficiency in the early stage of its establishment, and subsequently entered a stable development stage with high input-output efficiency.

In 2007, the pure technical efficiency from 2009 to 2012 reached 1.000, that is, the Arts Centre of China Agricultural University could maximise the output of art education with the existing resources, and the efficiency in the use of input factors had reached the maximum. At the same time, it shows that there is no redundancy in each input-output index, that is, if output remains unchanged, input factors can no longer be reduced.

In 2008, the comprehensive technical efficiency was 0.93, which was not as effective as DEA. If we simply apply the economic interpretation of the model, this result is generated because its

scale does not match the input and output, and the scale needs to be reduced. The main feature of decreasing scale returns is that when input factors increase in the same proportion at the same time, the proportion of output increase is smaller than the proportion of change in input factors.

Causes of Decreasing Scale Returns

There are two main reasons for the decreasing scale returns. One is the limitation of the availability of input factors in music education. With the gradual expansion of the scale of education, due to the limitations of some factors, the input elements needed in music education may not be satisfied. Second, when the scale of production is large, there is a decline in management efficiency, such as internal supervision and control mechanism, information transmission and other problems.

In reality, the reasons for this are more complicated. For example, in 2008, because of the Beijing Olympic Games, the University's Arts Centre increased its investments of material resources to organise various activities required by the Olympic Games. These activities occupied a lot of time, manpower and material resources but the input-output efficiency cannot be measured by the output index of the model. From long-term development trends and actual situation analysis, the reason for the decreasing scale returns is most likely that investments on teaching staff, per student expenditure input, course hours input, material inputs cannot be satisfied, making the output increase proportionally less than that of input increase, and causing a period of instability in the scale economy and efficiency.

Towards Improving Teaching Efficiency in Music Education

The roots of low efficiency of music education are attributed to several factors. Students look forward to learning advanced music theories and skills. It is necessary to meet not only the growing demand for music education but also to raise its quality. A complete and scientific system of aesthetic education that integrates elements of moral and physical aspects has yet to be established. The current aesthetic education resource configuration from the perspective of course structure, teaching staff, teaching environment as well as overall understanding, educational conception, objectives or assessment standards, and other aspects are still deficient. It is realised that significant imbalance between resource allocation and stated objectives will compromise the quality and efficiency of education. In the case of music education, the lack of research and planning of the curriculum have created a state of disorder and a lack of clear targets, proper design and well-structured standards.

As the staff in charge of arts education in the China Agricultural University the researcher, Wang Yi, was familiar with the existing problems in music education as well as issues concerning the improvement and efficiency of music education through her research and investigations from various angles (Y. Wang, Z. M. Liu, & Du, 2014; Y. Wang, C. T. Liu, Fu, X. X. Li & Wen, 2014).

The analysis based on the index on music education efficiency and current research on music education (including the researcher's research), it is possible to put forward several suggestions to improve music education offered by colleges and universities.

Music Education Curriculum

The current music curriculum system faces difficulties meeting the multi-level and diversified educational needs (Ren, 2018; S. Q. Liu, 2018; L. Q. Zhou, 2014; Qiu, 2020). A principal approach to overcoming the situation is to reconstruct the curricular design to provide consistent and practical guidance in teaching and implementation. To raise teaching efficiency, the curriculum has to emphasise diversified learning needs, the allocation of resources has to meet different learning needs, and the teaching methods must satisfy the objectives of professional learning and resource utilisation.

Based on the questionnaire survey of ten universities mentioned above, and taking into consideration the particularity and complexity of music education, a curriculum may be attempted to incorporate scientific, standardised and multi-level elements to meet the needs of different students (Wan & Mao, 2020). The curriculum is designed to adapt to three levels, namely, general courses for all students; elective courses for individual needs; and intensive courses for the talented to lay a good foundation for advanced music studies.

The failure of the current music education curriculum design to meet the different learning needs is the lack of learning resources especially to meet the personalised learning needs of students. Increasingly, integrating Internet resources into curriculum design has become an inevitable way to improve the efficiency of music education in the new era. The advantage of network and information technology is the integration of the high-quality teaching resources on a global scale and overcoming the limitation of the traditional class hours to facilitate uninterrupted and multi-dimensional teaching and learning (Xiao, 2014; Tian, 2019; Q. Chen, 2019).

Structural curriculum design also needs to fully consider the construction of teaching methods. Perceptual education is now a great trend to improve the efficiency of music education by fully invoking the feeling and experience of music learning. Perceptual education is a kind of visual education method that emphasises emotional experience. It requires teachers to present a picture and a sense of urgency in the instruction so that students may feel the teaching intention by intuition and grasp its educational value (X. P. Liu, 2017).

An effective way to apply perceptual education in teaching practice is mobile music learning and this may be achieved through cloud platform (Tian, 2019; Q. Chen, 2019). This instruction format should take into consideration the economic feasibility and the functional requirements of music education. The course syllabi would also include the extensive theme and rich contents of

the appreciation module as an auxiliary tool to implement music teaching and as means to raise the efficiency of music education through innovative ideas.

Stimulating Student Enthusiasm

A key measure to improve the efficiency of music education is to stimulate the learning initiative of students and nurture their learning ability. The role of music teachers in colleges and universities is to help students to make clear their ideals and to develop their self-development plans, and hence to encourage them to realise their future and dreams, and to motivate them and to develop their potential (Song, 2017). Many students are in a dilemma as to whether to pursue their music dreams from an academic or commercial perspective (Ge, 2017). It is the role of teachers to assess the musical potential of individual students and to apply individualised teaching to guide them to move forward.

Some students possess musical talents but lack performance experience or the opportunities to cultivate their music creative ability (Y. Liu, 2017). Students who are born actors and have a strong stage sense may be provided with professional guidance to develop their career in performance. Other students may acquire a music education as a means to pursue their special career paths (Xing, 2017). To students who have clear objectives in music education and are sufficiently motivated to work to realise their goals, the efficiency of music education in terms of teaching and learning can be significantly improved on a sustainable basis.

Adopting Modern Education Methods

Using modern educational methods is part and parcel of the attempt to improve the efficiency of music teaching (Li, 2017). In the case of music appreciation in the traditional teaching mode, students would enjoy a piece of musical work together in class, and then express their own opinions and intuitive feelings. Given the limited teaching time, there was minimal interaction between teachers and students.

With the aid of modern information technology and on the network platform, the possibilities for interaction between teachers and students as well as among online study groups may be significantly expanded. Appreciation and related study materials may be made available online to enable students a degree of flexibility of time and location in learning to make known their feelings and ideas in discussion groups.

Music teaching resources on the Internet offers immense possibilities to stimulate students and to inspire their professional creativity and at the same time provide new ideas on improving the efficiency of music teaching (L. Q. Zhou, 2014; Qiu, 2020; Xiao, 2014).

Teaching Methods

The music teaching process in colleges and universities should adopt diversified teaching methods to optimise cost as well as to exhibit the charm and value of traditional arts including music. Although music teaching is not concerned entirely only with abstract theories, modern technology will open new avenues to appreciate the beauty and charm of music and to help students to sharpen their aesthetic awareness and creativity. While music teachers should continue to explore and absorb advanced theoretical knowledge of music, they should also expose their students to different activities such as singing contests, conferences and performances on a regular basis in order to experience the real music generated and appreciated in real life.

Quality of Teaching

Upgrading the quality of teachers is inseparable from efforts to enhance the quality of music teaching (Xiao, 2014). Specifically, the following three points should be achieved. The first is to make the best of the teachers. Teachers should feel safe and free to start innovation in their teaching and demonstrate their potentials and teaching advantages. Teachers should have access to advanced teaching equipment and materials to operate in a conducive working environment. The second is to ensure that teachers engage in original research and be innovative. Involvement in research contributes to the teachers' academic standing and accumulation of musical knowledge and provides ideas on new and creative teaching approaches. They will then be in a position to keep up with the latest research in music education and effectively apply their knowledge and insights to raise the quality of their teaching. Lastly, on the question of the evaluation of teaching as part of the incentive package, it is necessary that teaching be appraised in terms of drawing the best out of students with different talents, learning styles, or handicaps.

Conclusion

Music education for the non-arts majors is intended to contribute to the holistic development of the individual. This objective is unlikely to be achieved as long as low efficiency of music education persists. As a component of aesthetic education, music education has yet to be developed on a systematic and comprehensive basis at the national level. In the overall sector of higher education, aesthetic education has not been allocated sufficient resources to support the functions of "teaching" and "learning" in the context of a comprehensive curricular structure, adequate teaching staff and teacher training, conducive teaching environments and national importance, among others. The mismatch between resource allocation and education objective does not help to raise the efficiency of music education and its image in society. The essential conditions required to sustain good teaching quality are lacking and the curriculum is weak in overall planning, comprehensive design, and clear objectives. Music education is clearly lacking in orderly development and tends to remain

at a "free-flowing" stage. There is thus a substantial difference between the current overall level of music education and the expectations of students.

The key to improve and enhance the efficiency of music education in colleges and universities lies in placing the programme in the overall education system of moral education and people cultivation, and constructing a scientific and standardised curriculum system that can meet the diverse learning needs of students at different levels and starting points. The feasible path is to promote perceptual education methods of strengthening feelings and experiences in music teaching, and to establish perceptual education resources platform to respond to different learning needs, and so optimising learning resource allocation, and effectively solving the problems of insufficient teachers and poor professional teaching ability.

These findings and suggestions, from the perspectives of educational concept, teaching method and teaching content, provide reference on the reform of music teaching and at the same time highlight certain theoretical and practical value of the music education of non-art majors in colleges and universities.

* Shuang Liu [刘爽] is Associate Professor, Qilu Normal University, Jinan, Shandong, China. Email: 2535716962@qq.com

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Notes

1 These universities and the number of students selected for questionnaire survey are: China Agricultural University (98), Renmin University of China (64), Beijing Union University (59), Beijing University of Technology (46), Beijing Institute of Technology (50), Capital Normal University (65), University of Science and Technology Beijing (51), Shandong Agricultural University (77), Northwest A&F University (61), and Henan University (50).

2 The input index of music education consists of manpower, financial resources, time and material resources. The output index comprises quantity and quality indicators. The quantity indicators include the number of students enrolled in the courses, the number of self-compiled textbooks, and the number of subject research projects, while the quality indicators include publications, the number of art troupe performances, and the number of art awards.

3 The DEA-Malmquist index method is a non-parametric research method, which has the advantages of not having to set production function form and parameter estimation, allowing inefficiency behaviour, using different dimensions of input-output data, and structurally decomposing Total Factor Productivity (TFP) growth. The basic principle of DEA-Malmquist index method is to construct the envelope surface of production frontier by observing the input-output data of each decision-making unit, and then to map the non-DEA effective decision-making unit to the DEA effective production frontier envelope surface. The relative efficiency of each decision making unit is evaluated by comparing the degree to which non-DEA effective decision-making units "deviate" from the DEA effective production frontier.

4 Scale Returns is to explain that, when production factors are doubled, there is constant return to scale (-) if the output is exactly doubled; increasing return to scale (IRS) if the output is more than doubled; and decreasing return to scale (DRS) if the output is less than doubled.

5 CCR refers to the names of A. Charnes, W. W. Cooper and E. Rhodes and their work on operation research published in 1978 as "Measuring the efficiency of decision making units

with some new production functions and estimation methods." *European Journal of Operational Research, 2*(6): 429–444. BCC refers to the names of R. D. Banker, A. Charnes and W. W. Cooper and their publication in 1984 of "Some models for estimating technical and scale inefficiencies in data envelopment analysis" in Management Science 30(9): 1078–1092.