Teaching Research Based on Intelligent Online Teaching Assessment System - Analysis of the Role of Aesthetic Emotion in Experiential Music Teaching

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Abstract. Experiential teaching in music curriculum is a pedagogical approach that promotes students' learning and understanding by actively involving them in music activities. Unlike traditional classroom teaching, experiential teaching focuses on enhancing students' aesthetic cognition and teaching effectiveness through hands-on experiences. In order to study the effectiveness of experiential teaching, we employed an online examination system which used the AESTHEMOS scale to rate and statistic students' aesthetic cognition before and after the course. After control group teaching comparison of Chinese classical music appreciation, students' aesthetic cognition of the music improved substantially after experiential teaching, and the teaching effect was significant. The study proves that aesthetic emotion plays an important role in experiential music education, which helps to cultivate students to participate in learning more positively, actively, and creatively, and enhances the overall teaching effect.

Keywords: experiential teaching, aesthetic emotion, teaching assessment, AESTHEMOS

1   Introduction

Experiential teaching approach have been adopted to be successful in many areas in recent years. For example，a Business English Program, art field, and so on. The success of these cases gives us a lot of inspiration. Therefore, we examine the effectiveness of experiential teaching in music teaching. College students are increasingly taking music appreciation classes. Numerous colleges and institutions provide music appreciation courses to help students improve their musical ability and aesthetic taste [1].

Through hearing and experiencing, the study looks to give college students the chance to experience the allure of music, enhancing their capacity to enjoy music.

Knowledge is formed through transforming experience, and the aesthetic experience is a competent activity that involves cognitive, perceptual, affective, emotional, and creative processes [2]. Meanwhile, this is not just to aid college students who are not majoring in music in comprehending the music appreciation course more deeply but also to develop students' aesthetic sensibilities through their appreciation, comprehension, and enjoyment of musical compositions, which results in their aesthetic experiences. This instructional approach strives to present a fresh viewpoint and idea through the use of aesthetic teaching objectives and teaching introductions.

However, it is difficult to assess the effectiveness of arts course. Art is a highly subjective discipline that is difficult to measure with traditional tests. The purpose of art courses is to cultivate students' aesthetic emotions, and our study suggests that teaching effectiveness can be measured by assessing students' aesthetic cognition.

1.1   Aesthetic Emotion

According to neuroscientific research, music can elicit feelings that go beyond simple happy or sad or pleasant/unpleasant dichotomies[3]. In music's processing, when someone listens to music, their emotional reaction, aesthetic assessment, and aesthetic choice are all strongly intertwined. Both emotional recognition—the way in which music expresses emotion—and emotion experience—the way in which people themselves experience emotion—are involved in the emotional response to musical aesthetics both of which are thought to be parts of the aesthetic emotional processing continuum[4].

1.2   Aesthetic Cognition and Teaching Effectiveness

Aesthetic cognition is an important psychological process of human beings, and with the emphasis on the human need for beauty and the development of cognitive psychology, the study of aesthetic cognition has become an important way of integrating comprehensive research on emotion and value judgment.

By cultivating aesthetic cognition and improving music literacy, students can have a more comprehensive understanding and analysis of musical works, which contributes to enhancing their music literacy, including awareness of music structure, form, and style, as well as understanding different musical periods and cultures. Music is an artistic form of emotional expression, and aesthetic cognition enables students to deeply experience and understand the emotions conveyed in music. Through studying music, students can develop perception and appreciation for beauty, allowing them to emotionally comprehend and express their own feelings. The aesthetic elements in music, such as melody, harmony, and rhythm, can stimulate students' interest in music. The enhancement of aesthetic cognition helps to inspire students' motivation to learn music, encouraging their active participation in music appreciation and learning processes. Aesthetic cognition represents the effectiveness of teaching in music appreciation because it focuses not only on students' perception and understanding of music but also on fostering emotional experiences, cultural awareness, and critical thinking in relation to music. Improvements in these aspects contribute to the formation of a well-rounded music literacy, facilitating better teaching outcomes in music learning.

2   Methods and Materials

A scale is a tool used to measure and assess a specific characteristic or attribute. It typically consists of a series of specific statements or questions designed to elicit responses or opinions from respondents. The design of a scale aims to provide a standardized and replicable way of measurement, enabling researchers to collect and compare data objectively. Through scales, researchers can quantitatively measure specific features of the subject under study, such as psychological states, behavioral habits, opinions, and more. Scales are widely used in various fields, including psychology, education, and health sciences, for research and evaluation purposes.

2.1   The Aesthetic Emotions Scale (AESTHEMOS)

The AESTHEMOS[5] is a tool for evaluation that can be used to measure the strength of aesthetic emotions (for example, when studying a fleeting aesthetic experience or experiencing a certain stimulus such as a picture, poem, piece of music, or film scene) or the regularity of aesthetic feelings felt throughout a prolonged aesthetic experience (for example, examining a situation as a whole such as a comprehensive exposition of art, theater production, or walk through nature).

The AESTHEMOS has 7 emotion factors with 42 subscales or items, and each one is designed to assess the emotional impact of an aesthetic experience in a highly diverse way, as seen in Table 1. These scales include prototypical aesthetic emotions (e.g., the feeling of beauty, being moved, fascination, and awe), epistemic emotions (e.g., interest and insight), and emotions indicative of amusement (humor and joy). In addition, the AESTHEMOS subscales capture both the activating (energy and vitality) and the calming (relaxation) effects of aesthetic experiences, It also has negative emotions that may contribute to aesthetic displeasure (e.g., the feeling of ugliness, boredom, and confusion). It is a self-report instrument created to assess aesthetic emotional responses in aesthetic perception and assessment across a variety of subject areas. The AESTHEMOS uses a 5-point Likert-style scale. The empirical evaluation of these emotions has proven to be made possible thanks in large part to the AESTHEMOS scale. This is explained by the tool's ability to encompass both happy and negative emotions, as well as emotions that contain both positive and negative components.

Table 1. List of AESTHEMOS scale items.

Negative emotions		Prototypical aesthetic emotions		Animation	
	I found it ugly		I found it beautiful		Felt something wonderful
	I found it ugly		Liked it		Invigorated me
	Bored me		Fascinated me		Energized me
	Felt confused		Baffled me		Was enchanted
	Made me aggressive		Felt deeply moved		Spurred me on
	Worried me		Surprised me		Motivated me to act

	Felt oppressive		I found it sublime	**Sadness**	Made me feel melancholic
	Spurred me on		Was impressed		Made me sad
	I found it distasteful		Touched me	**Epistemic emotions**	Challenged me intellectually
	Was unsettling to me		Felt awe		Made me curious
Nostalgia	Calmed me	**Amusement**	Delighted me		Was mentally engaged
	Felt a sudden insight		Amused me		Sensed a deeper meaning
	Made me feel sentimental		Made me happy		Felt a sudden insight
	Made me feel nostalgic		Was funny to me		Sparked my interest

2.2 The Role of AESTHEMOS in Teaching Evaluation

Using aesthetic emotion scales in experiential teaching is to evaluate learning outcomes. By using aesthetic emotion scales, educators can have a more comprehensive understanding of the aesthetic emotion students experience during their learning experiences. This can help assess the effectiveness of teaching methods and identify aspects that engage students' interests and positive emotions, thus guiding future instructional design. Different students may have different aesthetic emotional responses to learning materials, and by collecting this data, educators can better understand each student's learning style and preferences, enabling them to personalize teaching methods and meet individual student needs, enhancing students' learning motivation. By introducing the AESTHEMOS, educators can better understand which elements or activities can arouse students' interest, and thus design teaching activities in a more targeted manner to enhance students' learning experience and engagement.

In summary, using aesthetic emotion scales can help educators better understand students' emotional experiences during the learning process, thereby improving teaching methods, enhancing learning outcomes, and better meeting students' personalized needs.

3   Experiment

A teaching experiment was conducted to verify the role of experiential teaching in enhancing aesthetic perception and teaching effectiveness. The experimental flow is as follows:
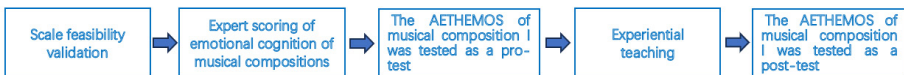

Fig. 1. Experimental flow

3.1   Participants

The participants in the experiment consisted of both teachers and students. There were two teachers involved in the teaching experiment, both of whom had more than five years of teaching experience and had extensive experience in experiential music teaching. There were 50 students participating in the experiment, all of whom were non-music majors.

The experimental course was "Chinese Music Appreciation". Two teachers conducted experiential teaching of different repertoire. Students rated their aesthetic perceptions of the music pieces using AESTHEMOS before and after the teaching, and we evaluated the effect of experiential teaching on aesthetic perceptions and teaching.

3.2   Experimental Flow

The experimental process is shown in Figure 1, in which parts 1 and 2 are the experimental preparation stage, and parts 3, 4 and 5 are the experiential teaching evaluation stage.

1. Scale feasibility validation

To test the feasibility of the questionnaire, we invited two professors and three associate professors to answer the pilot questionnaire in November, 2022. All of them are experienced music experts who have been working in the field of music for more than 10 years. Feedback indicated that all respondents understood all the questions.

2. Expert scoring of emotional cognition of musical compositions

A piece of Chinese classical music was chosen for this experimental course, namely "Colored Clouds Chasing the Moon". The music experts we invited for the scale feasibility analysis used AESTHEMOS to rate the music compositions. After 3 rounds of scoring, the experts agreed on the AESTHEMOS scores for the two musical compositions. In subsequent experiments, we used this as an aesthetic perception criterion for the two musical compositions.

3. The AETHEMOS of musical composition I was tested as a pro-test

Students participating in the experiment appreciated the selected musical composition and then rated their aesthetic perceptions according to the AETHEMOS.

4. Experiential teaching

The teacher teaches through experiential teaching. Experiential teaching in music courses involves engaging students in hands-on experiences and activities to promote their learning and understanding of music. In this approach, the teacher assumes the roles of a guide and facilitator, creating a positive learning environment. The focus is on developing students' musical perception abilities, rather than just imparting theoretical knowledge. Through experiential teaching in music courses, students can gain a deeper understanding of music and establish a solid foundation for their learning and development in the field of music.

5. The AETHEMOS of musical composition I was tested as a post-test

At the end of the experiential teaching session, students again rated their aesthetic perceptions according to the AETHEMOS.

3.3   Data Analysis Methods

We have adopted the following data analysis methods: Principal Component Analysis / Factor Analysis, Shapiro-Wilk test and Kolmogorov-Smirnov test, ANOVA (Analysis of Variance), regression analysis, and grouped regression analysis.

We conducted pre- and post-tests on music using emotion scales. Firstly, the normality of the emotion scale test structure was analyzed to determine whether to use parametric tests or non-parametric tests. If the data meets normal distribution, we will use parametric tests; otherwise, non-parametric tests will be applied.

Parametric test is a statistical method used to test hypotheses about one or more population parameters. However, parametric tests require strict adherence to the assumption of data distribution, typically normal distribution or specific distributions. In our experiments, our sample size is small, making it difficult to meet the requirements of parametric tests. For example, our experiment only involved 100 students (including control group), and the data is unlikely to meet the normal distribution assumption.

When the collected data does not meet the requirements of normal distribution, we use nonparametric tests. Nonparametric test is a hypothesis testing method that is used when the distribution of the data is unknown or does not follow common distribution assumptions. Nonparametric tests have the following characteristics:

1. Wide applicability: Nonparametric tests do not make specific parameter assumptions about the data distribution, so they can effectively conduct hypothesis testing even when the data does not meet the prerequisites such as normal distribution, making them more widely applicable.

2. Naturalness of data: Nonparametric tests often analyze data based on non-parametric features such as order, arrangement, frequency, which are closer to the natural state of the data and not affected by the data distribution.

3. Greater robustness: Nonparametric tests are more robust to outliers, meaning they can still provide reliable results even in the presence of outliers or when the data does not meet certain assumptions.

4. Application to small sample sizes: Nonparametric tests usually apply to data analysis with small sample sizes, especially when the sample size is insufficient, nonparametric tests can provide an effective method for statistical inferences.

5. Wide practical application: In practical data analysis work, the distribution of data is often not ideal. Nonparametric tests offer a solution for data that do not meet assumptions like normal distribution, making them widely applied and recognized in practice.

In summary, nonparametric tests play a significant role in data analysis by providing a statistical inference method that does not rely on specific assumptions, enhancing the robustness and applicability of data analysis, allowing researchers to conduct more comprehensive data analysis and hypothesis testing.

In this study, due to the small amount of data, we have employed nonparametric tests.

4 Result

The questionnaire was administered before and at the end of the music course and the questionnaire was based on the following principles.

1. The questionnaire was distributed online without interviewers present during the questionnaire completion process to avoid potential influence.

2. The survey was anonymous.

3. The questionnaire consisted of concise questions to avoid misunderstanding.

Based on the above points, expectation bias can be reduced in experiments and surveys[6].

4.1 Normality Test

The normality test is a method used in statistics to test whether data are from a normal distribution (also known as a Gaussian distribution). The normality test can help determine whether a set of data satisfies the assumption of a normal distribution, which can influence subsequent statistical inference and the choice of analytical methods.

Table 2. Normality tests for AETHEMOS of "Colored Clouds Chasing the Moon"

Item	Sample size	Mean	Standard deviation	Skew-ness	Kurto-sis	Kolmogorov-Smirnov test		Shapiro-Wilk test	
						D	p	W	p
Negative emotions(1st)	50	1.696	0.464	-2.527	5.962	0.363	0.000**	0.613	0.000**
Prototypical aesthetic emotions(1st)	50	1.464	0.453	2.618	9.652	0.328	0.000**	0.626	0.000**
Epistemic emotions(1st)	50	0.959	0.513	-0.041	-1.702	0.225	0.000**	0.840	0.000**
Animation(1st)	50	1.562	0.785	-0.813	-0.996	0.312	0.000**	0.761	0.000**
Nostalgia(1st)	50	0.810	0.504	-0.514	-1.551	0.289	0.000**	0.754	0.000**
Sadness(1st)	50	1.820	0.449	-2.553	6.069	0.496	0.000**	0.460	0.000**
Amusement(1st)	50	1.500	0.854	0.045	-0.845	0.150	0.007**	0.941	0.015*
aesthetic emotions(1st)	50	1.418	0.159	-0.472	0.166	0.117	0.084	0.969	0.202
Negative emotions(2nd)	50	0.858	0.518	0.039	-0.101	0.200	0.000**	0.899	0.000**
Prototypical aesthetic emotions(2nd)	50	0.704	0.550	4.276	18.581	0.371	0.000**	0.407	0.000**
Epistemic emotions(2nd)	50	0.503	0.261	2.402	8.668	0.221	0.000**	0.735	0.000**
Animation(2nd)	50	0.388	0.345	1.435	0.548	0.327	0.000**	0.662	0.000**

Nostalgia(2nd)	50	0.745	0.472	-0.083	-1.709	0.277	0.000**	0.797	0.000**
Sadness(2nd)	50	0.120	0.312	2.402	4.198	0.510	0.000**	0.416	0.000**
Amusement(2nd)	50	0.440	0.445	2.236	4.101	0.425	0.000**	0.569	0.000**
aesthetic emotions(2nd)	50	0.618	0.188	1.137	3.137	0.138	0.018*	0.926	0.004**

*p<0.05 ** p<0.01

As can be seen from Table 2, the fact that all items of the two scale statistics show significance indicates that the statistics do not have normal distribution qualities. If there is a need to compare the variability of data across groups, consider using a non-parametric test.

4.2   Nonparametric Test

Nonparametric test is a statistical analysis method used to compare the differences between two or more samples. Non-parametric tests do not make assumptions about the distribution of the data, making them more flexible and applicable to a wider range of data types and distribution forms[7]. Through normality testing analysis, our data does not follow a normal distribution, so we opted for non-parametric testing.

To facilitate the observation of teaching effectiveness, we statistically analyzed the difference between each item in the students' scale scores and the standard responses (expert scores).

Table 3. Nonparametric tests for AETHEMOS of "Colored Clouds Chasing the Moon"

Item	Period median M(P25，P75)		MannWhitney test U	MannWhitney test z	p
	First test(n=50)	Second test(n=50)			
Negative emotions	1.800(1.7,1.9)	0.900(0.5,1.1)	292.500	-6.664	0.000**
Prototypical aesthetic emotions	1.400(1.3,1.5)	0.600(0.5,0.6)	165.000	-7.567	0.000**
Epistemic emotions	1.170(0.3,1.3)	0.500(0.3,0.7)	676.500	-4.050	0.000**
Animation	2.000(1.0,2.2)	0.170(0.2,0.4)	332.500	-6.519	0.000**
Nostalgia	1.000(0.3,1.3)	0.750(0.3,1.3)	1188.000	-0.453	0.650
Sadness	2.000(2.0,2.0)	0.000(0.0,0.0)	47.000	-9.050	0.000**
Amusement	1.750(0.8,2.0)	0.250(0.3,0.3)	356.000	-6.364	0.000**
aesthetic emotions	1.400(1.4,1.5)	0.585(0.5,0.7)	11.000	-8.547	0.000**

* p<0.05 ** p<0.01

As can be seen in Table 3, the values of all eight aesthetic perception rating items were smaller in the second time (after the experiential teaching course) than in the first time (before teaching). This indicates that after the experiential teaching, the students' aesthetic perceptions were closer to the experts' aesthetic perceptions of the musical works. Figure 2 can visually demonstrate the improvement of students' aesthetic cognition.
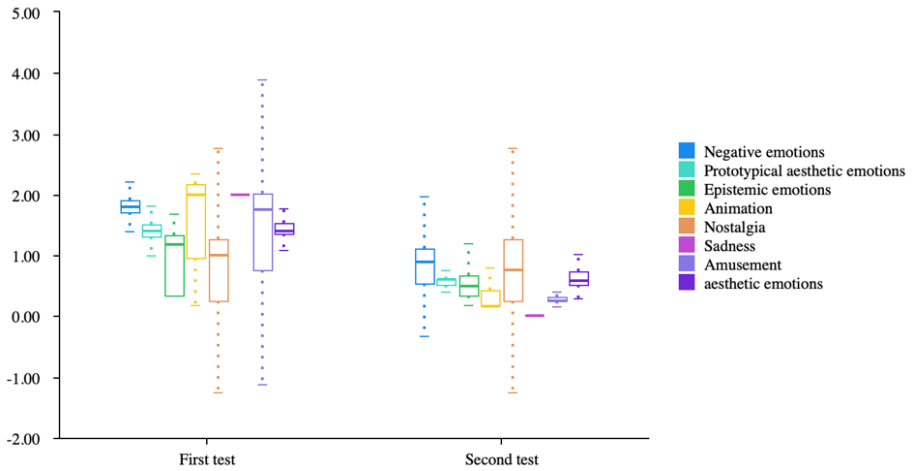

Fig. 2. Comparison of aesthetic cognitive differences before and after teaching

4.3   Control Group Experiment

In order to further understand the effectiveness of experiential teaching, we also conducted a control group experiment. We have invited a class of 50 students to teach in the traditional way, and the teaching track is also "Colored Clouds Chasing the Moon". After the course is over, two classes will take exams on the aesthetic perception of music, and the exam results were statistically analyzed using non parametric tests as shown in Table 4.

Table 4. Control group experiment

Item	Period median M(P25，P75)		MannWhitney test U	MannWhitney test z	p
	Experiential Education Classes(n=50)	General Education Classes(n=50)			
Esthetic cognition	75.000(70.8,80.3)	58.000(42.0,67.0)	337.000	-6.297	0.000**

From Table 4, it can be seen that the median score of aesthetic cognition assessment for experiential teaching classes is 75, while the score for traditional teaching classes is only 58. The performance of the experiential teaching class is 29.3% higher than that of traditional teaching, indicating that the effectiveness of experiential teaching in music courses is better than that of general teaching methods.

5   Conclusion

This study demonstrates the significant role of aesthetic emotions in experiential music education, positively influencing students' learning experiences, fostering music literacy, and promoting the development of music skills. It provides a reference for future research in teaching. The enhancement of aesthetic emotions may inspire students to actively engage in music composition, performance, and appreciation activities, thereby facilitating their comprehensive development of music skills. Aesthetic emotions enrich students' learning experiences by enhancing their engagement. Experiential teaching emphasizes creating a creative and captivating learning environment. By incorporating aesthetic elements such as art, music, design, etc., learning becomes more interesting and appealing, thus enhancing students' learning experiences. Research in this area not only helps understand the mechanisms of aesthetic emotions in experiential music education but also provides theoretical and practical support for designing and implementing more effective music education programs. This enhances the attractiveness and depth of learning, promoting holistic development in individuals. It helps cultivate students' active participation, proactiveness, and creativity in learning, thereby improving overall teaching effectiveness.

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