

Instructional evaluation of Music Course in Elementary and Secondary Schools based on SOLO Theory

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Abstract: Teaching Instructional evaluation can improve teachers' teaching capacity. It can not only understand students' learning level, make reference for teachers' following teaching programme and students' study proposal, but also put forward guiding suggestions for teachers' teaching design. At present, the "New Curriculum Standard" advocates comprehensive and diversified instructional evaluation, so as to put forward more propose directional evaluation results and grades for teaching process. However this will give rise to some new challenges for students and front-line teacher. This article will try to put forward an effective implementation path for the teaching evaluation of music subject in compulsory education stage based on the concept of SOLO theory and the characteristics of music subject teaching.

Keywords: Structuralism, Music education, The SOLO taxonomy, Instructional evaluation.

1. Introduction

In April 2022, the Ministry of Education of the People's Republic of China issued the Notice on Compulsory Education Curriculum and Curriculum Standards (2022 Edition). New Curriculum Standards pointed out that teaching evaluation is an important way and means to test and improve the quality of teaching, and that the diagnostic, motivational and improvement functions of evaluation should be take maximum advantage of promote students' development. The content of teaching evaluation involves various aspects such as learning attitude, process performance and academic achievement, while it should be carried out throughout the whole process of teaching and learning. This will also mean that the evaluation method which simply uses quantified scores as the standard will gradually be replaced by the diversified music teaching evaluation in the new curriculum. Therefore, the use of a quantitative and qualitative assessment theory to develop a teaching evaluation framework for the discipline of music is of great importance. The results presented by this evaluation theory should ideally reflect the usual teaching and learning processes of teachers and students, while at the same time showing clear hierarchical levels to translate the evaluation results in teachers' teaching designs and students' learning plans in order to form a complete set of teaching evaluation models. The SOLO Taxonomy responds to these requirements.

2. Theoretical Framework

SOLO(Structure of The Observed Learning Outcome)is a criterion-referenced evaluation methodological framework based on intellectual development achieved by a hierarchical description of problem solving based on Piaget's stage theory of cognitive development, proposed by Australian psychologists John B.Biggs and Kevin F.Collis in 1982 after a critique of Piaget's deep thinking on cognitive development. Biggs divides the SOLO theory into five levels: Prestructure, Unistrucre, Multistrucre, Relational and Extended abstract structure, and sets up a transitional structure between

each level. According to the results of the specific answers of the students, the level in a certain response structure was observed as the current level of specific thinking operation ability of the students, and these five levels corresponded to Piaget's pre-thinking, primary specific thinking, intermediate specific thinking, generalized specific thinking, and formal thinking. But they are essentially different in logic, so in a sense SOLO theory inherits part of Piaget's theory, so it is often classified as one of the neo-Piaget theories(Cai Yonghong,2006).

Biggs argues that the overall cognitive structure of students is not easy to observe, but we can clearly observe the complexity of the cognitive results in the structure of thinking that students show when faced with a particular task or a particular problem(Biggs,2014). In other words, learning behavior is unmeasurable, but the results of students' learning behaviors can be observed and judged. Teachers can make evaluation of students' learning process by observing students' learning results, forming a system of teaching evaluation based on learning results. In Evaluating the quality of learning The SOLO taxonomy, relevant quantitative research has been done on subjects such as history, chemistry, mathematics, and languages, but without a separate specific discussion on the application of art subjects.

The purpose of teaching evaluation itself is to use evaluation as a tool to measure the effectiveness of teaching. It is an important tool to improve the teaching and learning process, as well as to develop teaching standards for reference, to improve the quality of teaching, to establish the beginning of teaching, and to identify teaching problems play a critical role. There are broad and narrow concepts of music teaching evaluation. In a broad sense, the evaluation of music teaching is aimed at all fields of music teaching, involving music teaching and aesthetic education, moral education, intellectual education, physical education and music teaching system. It also relates to music teaching objectives, music teaching content, music teaching process, music teaching methods and music teaching management. Music teaching evaluation in a narrow sense is to evaluate the results of students' learning, and to make value judgments in terms of the growth of musical talent and aesthetic ability and artistic

sentiment(Long Yajun,2009).

3. Problem Statement

The new curriculum also specifies the connotation of learning quality and the specific requirements of the music subject, and put forward specific recommendations for teaching evaluation and academic level examinations respectively: In terms of teaching evaluation, a combination of itemized grades and rubrics can be used to give evaluations of classroom, homework and final sessions, to avoid simply evaluating students by scores, and the evaluation results can be presented through rubrics, rubrics should be concise, pertinent and targeted, so that students can accurately understand their own performance and results and know the direction of their future efforts. The assessment results should be interpreted in a personalized and developmental way, and the focus should be on using the results of student assessment to reflect and improve teaching; the academic level examinations are recommended in terms of proposing principles, proposing planning and developing questions, focusing on examining students appreciation, expression, creativity and other abilities as well as aesthetic interests and values shown in completing art practice tasks, and avoiding only The questions are selected from relevant realistic or historical materials that meet the students cognitive level and reflect the essential requirements of the art disciplines. The test types are diversified, focusing on individual and group projects, individual tests and overall assessments, objective and subjective questions, paper-and-pencil tests and behavioral expressions, and comprehensive tests of students academic achievement. Therefore teaching evaluation should focus on “how well” students have learned, rather than “how much” students have learned.

SOLO classification theory is applicable to the topic of determining "how good" the assessment science is, and the new educational perspective it brings can also bring some new insights to the current music discipline. Art disciplines, especially music, use highly abstract sound forms to express human mental thoughts and convey emotional language, and the performance of learning outcomes in music disciplines is often characterized by unpredictability, subjectivity, sensitivity, creativity, and internality. Hence music subject teaching evaluation does not lend itself to a rigid application of the behavior-based goal approach after making narrow behavioral prescriptions for the expected outcomes to form the results of the evaluation(Xiong Lei,2003).

4. Structure and Content of the Model

SOLO theory provides a strict and standardized operating system for open-ended test evaluation and distinguishes response types along four dimensions. These four components are ability (capacity or breadth of working memory), operations of the mind (the way clues are linked to responses), consistency and convergence (openness to conclusions), and response structure (irrelevant material to demonstrated material, unprovided material and rationale). Prior to using SOLO theory as a teaching evaluation technique, we should first analyze several types of concepts in music teaching in generic codes, such as aesthetic perception, cultural understanding, artistic expression, and creative practice, and codify each code in a vertical structure into the SOLO response structure. The scoring rules were developed based on qualitative coding and the results of

specific student performance were qualitatively described in five levels to improve the evaluation validity of the open-ended test questions.

After gaining a student's response or observing a student's reflection, also focus on the reflection in the conclusion that draws a conclusion in response to a question and maintains that resolution. In addition, transitional responses occur when students do not fully reach the new level in the five longitudinal structural levels. The transitional responses are denoted by 1A, 2A, 3A, and 4A, respectively, it can be expressed.

1. Prestructural: Students are unresponsive to the music curriculum, completely unable to perceive musical emotions and feelings, and unaware of the cultural context of the music they are learning. It is also impossible to perform the most basic musical performance during the music performance.

2. 1A: Students struggle to understand certain musical features, and when they have felt a certain sound or melody, they can generate some thoughts, but fail to start from the actual aesthetic imagery, which means that the perceptual deviation.

3. Unistructural: Students gain an understanding of the cultural context of the music they are studying, while generating perceptual thinking about music. Also support the answer with what they' ve learned, or have specific personal characteristics in their musical performance.

4. 2A: Students could utilize more relevant examples or practical tools to support their personal ideas or musical performances, but there could be irrational or contradictory answers and ideas.

5. Multistructural: Students can accessible a particular knowledge in detail, as well as perceive a certain musical emotion, master a certain performance technique, and make connections with all the content they have learned in the past. However, this connection between knowledge and skills is fragmented and unsystematic.

6. 3A: Students are able to make connections with learned knowledge through a multitude of abstract and complex musical motives. However, the answer covers too little content and ignores related knowledge points or interfering factors.

7. Relational: Students are able to make systematic connections to past knowledge in the face of questions and form generalized, affirmative answers, and to make effective connections between conclusions and examples to maintain personal conclusion points. In music performance, students will be able to integrate the knowledge and skills they have learned organically, transforming notes into musical forms as much as possible. What is important to bear in mind is that at this time students either have ignored the content or are unable to establish abstract concepts of knowledge and are not able to describe and interpret known musical fragments in an abstract manner.

8. 4A: Students' conclusions can be integrated with cases that do not appear in the teaching process. However, at this time, the subjective attitude or principle of the individual is not obvious and still ignores part of the emotional judgment of the music or the complete expression of the musical mood.

9. Extended Abstract: The structure tends to appear in the student population over 16 years of age, and this cognitive layer side is most common among the researchers. Students grasp the problem with an open-ended perspective, recognizing that something is not unique. In the case of music learning, a high degree of abstraction and comprehension of

music and textual notation is required, which means that the musical style is grasped and then recreated, reflecting the personal touch of the music performer or theoretical researcher.

When we evaluate the results of teaching and research based on these five levels, we can see that there is a tendency to use a qualitative method of assessing the results of learning and teaching. The criteria of teaching evaluation are more open at this time, which also helps students and teachers to clearly understand their current level and plan strategies for improvement and advancement. Better implementation of the directional analysis of teaching evaluation requirements.

As for teachers, through the SOLO theory evaluation model to control and position the teaching quality of each link, teachers can deeply understand students' learning situation, form effective and reasonable teaching reflections, and adjust the teaching progress in time. Moreover, the theoretical framework can organically integrate students' learning outcomes with instructional design to form a systematic and standardized model of teaching structure in order to improve teachers' teaching and advance and improve various aspects of teaching activities. For the final academic evaluation, the longitudinal dimensional level can be given as a specific item indicator in the summative evaluation. It can also reflect specific quantitative criteria while ensuring qualitative evaluation.

5. Discussion

The new content and requirements of the new 2022 edition of the curriculum for teaching evaluation indicate that we are moving away from the traditional teacher-centered, teacher-teaching, and test-based teaching evaluation system that favored a focus on achievement to one that builds student-centered. More attention should be paid to the evaluation criteria focusing on the students' learning process and the comprehensive accomplishment formed by the students' core competence. Nevertheless it will also be more difficult for students and teachers to face in practice. To begin with, from the teacher's perspective, qualitative assessment of student learning outcomes will generate a greater workload of. Theoretical knowledge points can be written with qualitative characteristics of test questions to get the students' answers, but musical ability is a synthesis of skills and thinking and perception, it is not easy to achieve qualitative formative assessment in singing or playing. The teacher's individual competencies will directly affect the evaluation results. Teachers' explanations of evaluation results are also strongly subjective, and even though most schools and individual teachers are trying to minimize the influence of this factor, it is difficult to achieve certain quantitative standards, and how to establish an effective connection between evaluation and instructional design will be determined by individual teachers' abilities. Secondly, this kind of comprehensive literacy examination has broken the drawbacks of traditional examination-based education single evaluation, the result of the assessment is a concentrated reflection of the usual learning process, more comprehensive, the evaluation criteria become diversified, and the result is no longer presented in a single score or grade. Nevertheless, this places higher demands on students' performance in the assessment process, especially in the performance, external interference factors, and students' own factors (personality traits, agility of thought, desire to perform, psychological quality of performance). Mere performance does not really show the students' grasp of

the knowledge and skills they have learned. Furthermore, the formation of qualitative evaluation places high demands on the implementation of teaching evaluation subjects. In addition to having a high level of subject expertise and professional competence, the evaluator must have a deep enough understanding of the evaluation subject and the learning process, and must have a strong integrative mind. Create objective, true, fair and oriented evaluation results. Thus, the new music teaching evaluation is also limited by the experience, competence, and personal intrinsic factors of the assessor. Finally, in the process of quantifying the summative evaluation, a closed examination or a purely open assessment does not yield nearly reasonable quantitative scores or standards, and the method of evaluation should make the two organically integrated, which also requires us to make reasonable design and arrangement of the evaluation methods and approaches before the evaluation work begins.

SOLO theory has a descriptive division of levels, while focusing on the qualitative division of students' mastery of knowledge and level of thinking, which in turn improves the effectiveness of evaluation. It attributes students' mastery of the problem to different levels of thinking, each of which also reflects the process of qualitative to quantitative change. In the specific process of evaluation, we can determine the specific level of students based on their answers, so that we can determine the level of students' understanding of a certain problem, and thus understand the results of students' learning and improve teaching strategies. This also provides a theoretical basis for open-ended questions, which have a unique advantage in testing students' logical thinking skills and creativity. Even more significant is the multidisciplinary nature of SOLO in examining learning outcomes, which can show how well students can integrate after disciplinary segmentation, especially at the level of multi-point structure, correlation structure and abstraction expansion. The knowledge developed at this stage is multidisciplinary, as in the multipoint structure, where cognition is present in multiple disciplines simultaneously, but students also do not integrate it directly (Jacobs H H, 1989). Learners engage in the learning process with an understanding of the central theme and are able to apply the procedural knowledge acquired in each discipline (Ivanitskaya L, Clark D, Montgomery G, 2002). In this way SOLO will not only produce qualitative formative evaluations, but will also assist the evaluation subject by quantifying the evaluation results and obtaining specific corresponding grade scores. In addition, SOLO theory can also provide effective solutions to the comprehensive assessment of music practice ability, music appreciation ability and perception ability with a multidisciplinary and integrated evaluation mindset.

But there are still doubts to be explored and solved when applying SOLO evaluation theory in music teaching evaluation specifically. Firstly, the SOLO classification theory is a qualitative description, and in the actual teaching based on SOLO classification theory to correctly determine the level of students' learning structure, and then determine the level of students' thinking, students' responses and reflections no longer have a uniform standard, which causes greater interference for teachers to analyze and grasp the evaluation results. In the second place, SOLO classification theory is more inclined to be evaluated in open-ended questions, and because of its own theoretical characteristics, it does not have a greater advantage in closed-ended questions (objective questions). How to apply different levels of

structure to the compilation of examination questions and assessment standards depends on teachers' personal experience and ability.

Finally, SOLO theory is divided into only 5 levels, and although there is a transitional structure, overall, the differentiation of the test questions developed based on SOLO is still low. The individual differentiation of students is also directly reflected in the results, especially in the class, the students have different ways of thinking for the emergence of teaching guidance evaluation and teachers' learning situation analysis, the reference standard is also multi-dimensional. As a result, both open assessment and closed Q&A require teachers to consider the whole process of teaching and learning comprehensively, and at the same time, large-scale selective assessment scenarios can bring unpredictable workload to teachers or evaluators, which is one of the limitations to be broken. In addition, in terms of primary and secondary school students' physical and mental development, the highest of the five levels, the abstract expansion structure level, is difficult for students to reach, and Biggs' own experiments have proved that usually only groups of students over 16 years old can reach this level, but we cannot deny the importance of this level in teacher evaluation and teaching process evaluation, which is crucial for teachers' teaching reflection and instructional design.

6. Conclusion

The current process of music teaching evaluation should reverse the traditional notion of evaluating students' learning outcomes and teachers' teaching abilities simply by how well they get the test questions right, how inaccurate their playing or singing is, and whether their performance is complete enough as the main reference object. It is necessary to break the limitations of the cold numbers formed by this monolithic assessment concept to formative assessment, and to reflect the qualitative and differentiated results of comprehensive analysis arising from the teaching of students according to their abilities. There is a greater need to shift the content of teaching evaluation from a single knowledge or skill test to one that reflects a diverse and integrated assessment of music

and literacy, and the evaluation process shifts from a focus on the end result of learning to a focus on all aspects of teaching and learning. Although the current teaching evaluation model of music subjects seems to be flawed under the requirements of the new curriculum, SOLO theory can bring a new solution. Music as a kind of art of time is fleeting, it requires the appreciator's full attention to perceive the "trajectory" of the sound with high concentration, and the same is true in the process of music teaching evaluation. If the melody is interrupted, it cannot be quickly returned to a point where it can be rethought and discussed. Music is still a cultural transmission vehicle different from symbols such as words and language, and the perception of emotions will not be as clear and specific. The nature of art itself makes the discipline open-ended and cannot be as highly precise as natural disciplines. Consequently, when we apply SOLO classification evaluation theory, we should also pay attention to the appropriateness of the topic and avoid rigidly applying the questions and evaluation results to the framework of the theory and losing the essential meaning and purpose of the theory.

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