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An Evaluation Method of Art Teachers' Cooperative Communication Ability Based on Task Situation

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ABSTRACT

To development an evaluation of the cooperation and communication ability of art teachers in colleges and universities. First, based on the teaching task situation of art discipline, the critical incident technique was introduced to carry out semi-structured interviews. According to the differences in teaching task situations, the art teachers' cooperation ability was scored from three dimensions: establishing and maintaining consensus, taking appropriate actions to solve problems, and maintaining team organization forms. Then, the indicators are set to form a language communication ability evaluation method based on the teaching task scenario. Finally, select front-line teachers with more than five years of teaching experience as the object, design and implement the cooperative communication ability evaluation experiment based on the above evaluation methods. The cooperation and communication ability evaluation experiment can be applied to the quantitative evaluation the performance of art teachers in their post capability. The cooperative communication ability evaluation experiment can provide a new idea for the quantitative and standardized method, and also provide a basis for the next step of developing corresponding evaluation software and tools.

Keywords: Evaluation method, Art teacher, Cooperative communication ability

INTRODUCTION

The task-based teaching model is a combination of scenario-based teaching and task-based teaching. Situational teaching mode refers to the creation of visual and vivid scenes based on the content to be taught, which can actively promote students' self-learning ability and their ability to analyze problems independently. Confidence and cooperation play an important role in learning, and the cooperative learning theory of "teacher-teacher interaction" is used to enhance communication between teachers, advocating that two or more teachers share the task of teaching at the same time in the classroom.

The concept of teacher-teacher interaction is essential for human resources and the importance of teacher-teacher interaction in the educational process (Fu J, 2007). Communication and cooperation is a goal-oriented activity, which is carried out to reach certain pedagogical goals. Art subjects have their educational peculiarities, and communication and cooperation between

teachers and students and teachers is often more than in general subjects, and the ability to cooperate and communicate in different task scenarios is particularly important. While there is more research on the development and study of cooperative communication skills among students, there is less research on the assessment of cooperative communication skills of art teachers. Based on the cooperative communication ability assessment system, we introduce the teaching task context of art disciplines, propose a task context-based method for measuring art teachers' cooperative and communication abilities, and conduct experimental validation through a comprehensive survey method to achieve accurate assessment and dynamic monitoring and development prediction of art teachers' cooperative communication ability levels in task contexts, so as to achieve more efficient and targeted teaching and improve This will enable more efficient and targeted teaching and improve the teaching ability and classroom quality of art teachers.

THEORETICAL RESEARCH

Teamwork competence refers to the ability to work as a team member by sharing resources and collaborating with other team members, communicating with each other, helping each other and trying to integrate into the team, which eventually makes the whole team complete the task successfully. In current practice, collaborative problem-solving skills are usually measured in a small, non-standardized way, such as a holistic evaluation by the instructor of each student in the class and described in the student's end-of-semester rubric. Because most teachers do not receive systematic training in the assessment of collaborative problem-solving skills, and because such holistic evaluations are often subjective and vary in their assessment scales, these rubrics do not accurately reflect students' collaborative problem-solving skills, whereas teachers' collaborative communication skills refer to teachers' ability to provide support to each other in the teaching process and to share knowledge to improve teaching skills. and sharing knowledge, and the ability to collaborate in order to improve teaching skills, learn new knowledge, and solve new problems.

So far, there have been some important attempts in empirical studies on large-scale measurement of collaborative problem-solving skills, such as Assessment and Teaching of 21st Century Skills (ATC 21S) (Griffinp, 2012), PISA 2015 Collaborative Problem Solving Skills Assessment (OECD, 2017), and the study of a standardized test prototype implemented by ETS on measuring collaborative problem solving skills (Hao J, 2017). All of these large-scale empirical studies used online computer-based virtual collaborative tasks: the PISA 2015 used a human-computer collaborative approach, and the ATC 21S and ETS studies mainly used human-human collaborative approaches.

Based on the above studies, in order to more realistically reflect the collaborative ability of art teachers in their working state, this test combines special situations with art classroom teaching tasks; to eliminate the uncertainty of human-human collaboration, the test adopts the human-computer interaction mode of conversational agents (Yuan J L, 2016); to reduce the

residuals caused by language ability differences, the test adopts the interaction mode of dialogue selection; to optimize the To optimize the structure of the questions, the test was based on the PISA 2015 collaborative problem-solving framework, which measures art teachers' collaborative skills in 12 dimensions. Finally, with reference to Item Response Theory (IRT) (Hao J G, 2019), the subjects' collaborative ability was scored by multivariate scoring according to the differences in path node selection, and the results were output through the system.

In the process of art teachers' teaching, collaborative skills are mainly used to solve problems in specific task contexts. In this study, the PISA 2015 assessment matrix was used to reflect the subjects' collaborative problem-solving skills, as shown in Table 1.

Communication is the main expression of team members' ability to convey information, express emotions, and exchange ideas, and it is generally believed that good communication skills can help to resolve conflicts and enhance

Table 1. PISA 2015 collaborative problem solving test ability matrix.

	Collaborative ability		
Problem solving ability	(1) Establishing and maintaining a common understanding	(2) Take appropriate actions to solve problems	(3) Establish and maintain team organization
(A) Inquiry and understanding	(A1) Discovering the perspectives and abilities of team members	(A2) Discovering goals and solving problems Types of cooperative interactions required	(A3) Understanding problem-solving roles
(B) Representation and Formation	(B1) Building shared representations and negotiating problem meaning of the problem	(B2) Identify and describe the tasks that need to be accomplished	(B3) Describe roles and team organization
(C) Plan and execute	(C1) Communicate with team members the actions that will be or are being performed	(C2) Making plans	(C3) Compliance with rules of participation
(D) Monitoring and feedback	(D1) Monitoring and refining common understanding	(D2) Monitoring behavior results and evaluation	(D3) Monitoring, providing feedback, and Adapting to team organization and roles

team effectiveness (Zhang Z, 2016). At present, communication skills are mostly measured in the field of education and interpersonal communication in health care, and some tests on communication skills are available in the form of scales and tests. Scales are mainly based on self-assessment or colleague evaluation and are highly subjective and susceptible to a variety of uncertainties. The most widely used test is the word pair matching test in the DXC psychometric system of the Fourth Military Medical University, which tests the ability to understand words accurately. There are international methods such as Cookie theft (Feng X, 2020) and Boston Diagnostic Aphasia Examination (BDAE)(Wang X, 2015), which are mainly used to measure the language ability of patients with brain injury, but their essence is the measurement of the subject's language expression, information transfer, and accurate description. The Boston Diagnostic Aphasia Examination (BDAE) and other methods are mainly used to measure the language ability of brain-damaged patients. The Boston Diagnostic Aphasia Examination (BDAE) is one of the

Table 2. Boston aphasia measurement indexes and scoring criteria.

Analysis indicators	Specific meaning
Total number of words	Delete the question and response of the main test and count the total number of words.
Percentage of incorrect information	Pick out incorrect expressions in the text. Non-specific nouns, such as stuff, are not specific if you can infer what "stuff" is. then "something" is not a non-specific noun.
Percentage of disfluent expressions	Pick out disfluent words
Percentage of words providing support structure	Pick out words that provide support structure
Percentage of repeated content	Pick out the words that are repeated from the previous content. It is not necessary to be precise here that each word is exactly the same as the information expressed earlier. As long as the meaning is the same, it is counted as repetition
Percentage of valid image information	The valid information of the picture is selected, and any information that appears in the picture is considered as valid information.
Explain the percentage of valid information in the picture	Pick out the words that explain the content unit. Words that explain the content unit include descriptions of the characters' mental activities, descriptions of what happened descriptions of causes, etc.
Percentage of irrelevant words	The irrelevant words were selected. The remaining words that could not be classified in the above categories were irrelevant. Information that is not in the picture information is considered irrelevant.

most widely used diagnostic tests for aphasia in the United States, and a set of standardized scoring criteria has been developed for this test. Therefore, this paper introduces the Boston Diagnostic Aphasia Test and incorporates the art course teaching scenario, presenting the questions by means of pictures and text questions to test the semantic and output abilities in three dimensions: semantic content, lexical content and syntactic complexity, as shown in Table 2.

EXPERIMENTAL DESIGN

Art teachers' collaborative skills are mainly applied in teams of teaching and research groups formed by teachers specializing in different courses. Since each of them has different professional orientations, teaching hours, etc., and treats problems or tasks from different perspectives, additional interactive activities are needed between team members to alleviate conflicts in information needs and to achieve optimal results through negotiation among all parties (Lai HY, 2020). One of the most necessary aspects of teamwork is the establishment of shared situational awareness (SSA), where everyone in the team maintains the same level of situational awareness (Shi Yusheng, 2018- Wang Yanqing, 2021), and appropriate SSA can form team cognition by performing interactive processes (Salmon PM, 2009- Salas E, 2004), while team members need to actively exchange the information necessary to generate team cognition.

Combining the three key aspects of information sharing, interactive negotiation, and task completion necessary for art teachers to engage in teamwork, and the PISA 2015 collaborative problem solving framework (Xu S, 2019), the measurement of collaborative competence is divided into three dimensions: building and maintaining consensus, taking appropriate action to solve problems, and establishing and maintaining team organization, presenting ideas, interacting with questions and answers, revising and refining, making plans, assigning work The nine specific indicators are shown in Table 3.

From the beginning to the end of each task, the participant communicates, chats, and acts with the conversational agent in multiple rounds, which form a series of specific questions. Each question gave a limited number of options that the test taker chose to determine the path to complete the task, and the end point of one task naturally formed the starting point for the next task. Each test question points to one of nine specific indicators of the Art Teacher Collaboration Competency Assessment. Dynamic situations are arranged during the test, and subjects are required to discuss with conversational agents with reference to contextual changes, class size, lesson schedule, class time, and lesson cycle, and to choose the best instructional option within a limited time frame. The project contained four main task scenarios, with the number of questions chosen from 5-10.

Each option of the test questions points to one of the indicators of art teachers' collaborative skills assessment, and the different paths are scored through the expert interview method. Finally, the score of the subject's choice of questions was the total score of the cooperation ability assessment items.

Table 3. Indicators of pilot cooperation ability assessment.

Primary dimension	Secondary dimension	Explanatory notes
Build and maintain consensus	Presenting ideas	Provides or introduces new ideas, perspectives, suggestions or solutions, clarifies issues
	Interacting with questions and answers	Give judgments on others' views and explain them back
	Revise and refine	Revise or refine ideas that have been presented
Take appropriate action to solve problems	Develop a plan	Develop an orderly plan for performing tasks
	Assign work	Rationalize work assignment according to purpose
	Complete the work	Work according to the original plan
Build and maintain team organization	Emotional support	Expresses emotional support such as comfort, encouragement, and affirmation
	Information exchange	Exchange of information known to individuals
	Supervision	Supervision of the discussion process and its implementation

ART TEACHERS' COMMUNICATION ABILITY ASSESSMENT DESIGN

Communication is a necessary component of cooperation and an essential way for team interaction, information transfer, and problem negotiation. Communication of art teachers mainly consists of two parts: outputting information and receiving feedback; outputting information mainly refers to the art teachers' teaching of course knowledge in the course of instruction, while receiving feedback refers to obtaining students' ideas and opinions in a timely manner. The most important aspect of communication is the authenticity of conveying information to the recipient for interpretation (Solari EJ, 2020), i.e., the accuracy of linguistic expressions, where the assessment of linguistic competence includes standardized language assessment and narrative discourse assessment, combined with the Boston Aphasia Test dimensions, the initial screening of art teachers' linguistic competence assessment dimensions, and also through the analysis of teaching scenarios as well as expert research found that: Accurate expressions, effective expressions, and flow expressions were found to be the most important in classroom communication. The weights of each index were obtained by expert scoring method, in which the accuracy rate was 40%, the efficiency rate was 35%, and the fluency rate was 25%, as shown in Table 4.

The purpose of the Art Teacher Communication Ability Test is to test the semantic ability and linguistic output of individual art teachers. In this test, four photographs of classroom information (including time, students' status, teaching space, etc.) of an art course were presented. The participants were asked to describe the content of each picture in detail and to interpret the information in depth (e.g., describe the students' listening status at this time, etc.). In this process, the subjects were required to keep the content accurate

Table 4. Indicators of art teachers' communication ability.

Analysis of indicators	Specific meaning	Weighting
Accuracy rate	Accuracy of the information conveyed	40%
Efficient	Combining key words to extract effective information from the text	35%
Fluency rate	Fluency of the subject's verbal expressions	25%

and the language fluent as much as possible. The number of accurate words, effective words and fluent words in each picture description was counted.

The fluency rate was calculated based on the interval of characters, and the fluency rate was calculated from the total number of words to the total time. During the test, the total number of words (N) and description time (T) of each text were recorded, and the number of valid words (n1) and correct words (n2) were extracted to obtain the efficiency (a), accuracy (b) and fluency (c) of the subjects, and finally the final score of the subjects' language ability assessment was obtained by weighting:

$$\text{Efficient} : \text{a}\frac{n1}{N} =; \text{Accuracy} : \text{b}\frac{n2}{N} =; \text{fluencyrate} : \text{c} = \frac{N}{T}$$

$$\begin{aligned} \text{Single question score} &= (50\%\text{a} + 30\%\text{b} + 20\%\text{c}) \times 10 \\ &= \frac{5n1}{N} + + \frac{3n2}{N}\frac{2N}{T} \end{aligned}$$

The subjects were all art teachers of the Chinese Academy of Opera, 13 in total, all with more than 5 years of teaching experience. Through data screening and analysis, a total of 13 groups of valid data were retained, and the data were collected from November 2022 to January 2023.

The assessment of cooperation ability relied on the Questionnaire Star platform to design and distribute the questionnaire, and the assessment of communication ability relied on cell phone recordings for voice recognition and text conversion work.

A total of 13 groups of data were collected in this experiment, which were divided into high and low groups according to the scores of subjects' cooperative ability and communication ability.

Further tests of variance between the two groups of data showed that the scores of cooperative ability of the subjects in the two groups ($t = -3.483$, $p = 0.010$) and communication ability scores ($t = -2.625$, $p = 0.010$). 010) and communication ability scores ($t = -2.625$, $p = 0.034$) were significantly different, indicating that the test had good discrimination.

The results were analyzed in summary and the normality test was performed on 13 groups of data and showed significance ($p>0.05$), implying that the data had normal qualities.

Table 5. The scores of each dimension of art teacher's cooperative and communicative ability in high and low groups.

Indicator Name	High group	Low score
Cooperative ability	25.7	13.6
Consensus building and maintenance	11.2	7.7
Take appropriate action to solve problems	12.7	5.2
Establish and maintain team organization	1.8	0.7
Communication skills	6.746	4.23
Accuracy rate	0.724	612
Efficient	0.367	0.301
Flow rate	4.21	3.85

CONCLUSION

In this study, the test of variance for 13 subjects found significant differences between high and low groups, and the measured data possessed good discrimination, proving that building and maintaining consensus, taking appropriate actions to solve problems, and building and maintaining team organization are important indicators for evaluating art teachers' ability to cooperate, and accuracy, efficiency, and fluency from are important indicators for evaluating the level of art teachers' communication ability. Most of these indicators were positively correlated with the level of competence in this dimension.

This study was conducted in a small scale, and the amount of data was small. Extensive experiments can be conducted to test the validity of the model with more sufficient data, and eventually form a perfect and reliable system for assessing art teachers' cooperative communication ability, aiming to provide a new idea for the quantitative and standardized assessment of art teachers' cooperative communication ability, and to provide a basis for the development of corresponding assessment software and tools.

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