

Application of Performance Assessment in the Teaching of College Gymnastics Course

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Abstract—The research examines the efficacy of performance assessment in collegiate gymnastics courses in improving participant engagement, teamwork abilities, physical abilities, and overall practical skills. The researcher collected pretest and post-test data from both the experimental and control groups, evaluating performance across multiple domains. The findings of the study demonstrated a statistically significant enhancement in post-test scores on all dimensions for the experimental group, as compared to pretest scores. This suggests that performance assessment has a favorable influence on participant outcomes. On the other hand, the control group demonstrated minimal changes in both pretest and post-test scores, underscoring the intervention's efficacy. Moreover, the study revealed notable disparities in post-test results between the experimental and control groups, suggesting that performance assessment is more effective in promoting skill enhancement. In general, the results indicate that performance assessment is a helpful instrument for augmenting learning and skill advancement in collegiate gymnastics, underscoring its significance in maximizing participant achievements and raising the quality of gymnastics instruction.

Keywords—learning interest, collaboration skills, motor skills, comprehensive application abilities

I. INTRODUCTION

Currently, with the requirements put forward by China's new curriculum reform, teaching assessment has undergone changes, transitioning from a previous emphasis on grades, outcomes, selectivity, and final assessments to a focus on cultivating students' interests in learning, comprehensive application abilities, social adaptability, and healthy behaviors. The primary function of performance-based assessment is to nurture students' generative and creative abilities, enabling them to solve new problems and create new things based on the knowledge they have acquired. This type of assessment is used to evaluate students' mastery of knowledge and skills, while also fostering the development of their comprehensive abilities in practical operations, problem-solving, communication, and collaboration. In the context of gymnastics curriculum teaching, which emphasizes the application of theoretical knowledge and the practice of

technical movements, performance-based assessment effectively addresses the shortcomings of traditional assessment methods that primarily focus on outcomes.

Performance assessment is a form of qualitative assessment that emphasizes the observation and analysis of students' performance tasks in real or simulated teaching contexts and assesses their performance results and progress [1]. Performance assessment authentically reflects students' learning, encompassing not only the outcomes of learning activities but also their ability to solve practical problems in gymnastics courses. The process of teaching assessment should align with the teaching objectives, and in gymnastics education, the primary focus is on nurturing students' knowledge, skills, and practical abilities.

Therefore, promoting the widespread use of performance assessment in gymnastics course teaching is worthy of attention and promotion. It can help fill the gap in the application of performance assessment in gymnastics-related courses.

II. THEORETICAL ANALYSIS

A. Implications of Constructivist Theory for Performance Assessment

Constructivism emphasizes that students use their original knowledge in real and concrete situations to solve the problems in the situation, and the teaching under the guidance of constructivist theory focuses more on contextual teaching, which is exactly the same as the nature of performance assessment, so constructivist theory provides the basis and inspiration for how to use performance assessment [2].

Constructivism believes that learners learn through "assimilation" and "adaptation", assimilation is to extract external information and then put it into their original cognitive structure, and adaptation is to change their cognitive structure because of external stimuli. cognitive structure because of external stimuli [3]. This is a very complex process, which is difficult to do by oneself, and due to the differences in personal experience, the understanding of external information is not the same, so to strengthen the communication and cooperation between individuals, share resources, and learn together can better solve the problem or complete the task, and at the same time, help to improve the individual's knowledge structure.

To sum up, the inspiration of constructivism for performance assessment is that constructivism emphasizes that teaching and learning should be carried out in real and meaningful contexts. Based on this, the design of assessment questions should also focus on the authenticity of the context, take into account the students' ability to flexibly apply what they have learned in the real context, and focus on the students' ability to solve problems in the real context.

B. Application of Performance Assessment in Gymnastics Teaching

Regarding the specific process of applying performance assessment in physical education curriculum thinking and ideological education, as outlined by Wang and Lv [4], the process involves "clarifying assessment objectives—creating problem scenarios—extracting ideological and political education elements—establishing performance tasks—developing grading rules—conducting assessment and feedback". Following the innovative approach proposed by Xue and Zheng [5] for grouping the construction of ideological and political elements in physical education courses, performance assessment in gymnastics courses (including gymnastics, artistic gymnastics, rhythmic gymnastics, and cheerleading) can be applied. This approach fully explores the ideological and political elements and educational factors inherent in gymnastics courses, providing practical operational guidance for the application of performance assessment in physical education curriculum and ideological and political education. Incorporating performance assessment into gymnastics curriculum research, Xie and Cai [6] proposed that in primary school gymnastics teaching, one should first analyze the teaching materials and the students' situation, determining the teaching content. The core of instruction should revolve around "performance, creation, and collaboration". Chen and Chen [7] have pointed out that performance assessment in gymnastics and aerobics teaching should focus on scientifically evaluating student behavior and performance results. This maximizes the assessment's impact on student attitudes, interests in learning, cooperation skills, and healthy behavior, among other aspects.

From the research on the application of performance assessment in gymnastics teaching, it is evident that there is relatively limited relevant research. However, existing research suggests that constructivist theory emphasizes student engagement and the subjective construction of knowledge. Gymnastics, being a sport that requires highly personalized skills and physical coordination, aligns well with constructivist educational perspectives that encourage students to construct their own knowledge through active participation and practical experiences. Within this theoretical framework, gymnastics courses can focus on fostering students' autonomous learning and problem-solving abilities, enabling students to gain a deeper understanding and mastery of gymnastic skills.

Furthermore, constructivism provides a valuable mindset for designing performance assessment tools, allowing assessments to better reflect students' learning

processes and knowledge construction rather than traditional grade-based measurements.

III. SIGNIFICANCE OF THE STUDY

Students: Gymnastics course students are the primary beneficiaries. Performance assessment can promote active engagement among students, encourage self-directed learning, and provide opportunities for error correction and performance improvement. Furthermore, performance assessment aids in a more comprehensive understanding and mastery of gymnastic activities, fostering creative thinking, self-efficacy, and overall comprehensive abilities. It equips students with valuable skills and qualities for their future academic and professional careers.

Teachers: Teachers gain deeper insights into students' learning needs and progress, enabling them to provide personalized feedback and guidance for each student. This enhances overall teaching effectiveness, motivates active student participation, and achieves comprehensive educational goals.

Administrators of the school: Improved quality of gymnastics course instruction contributes to elevating the overall educational standards of schools. Students who experience personalized support and recognition tend to be more satisfied, ultimately enhancing graduate employability. It drives schools toward more innovative and personalized educational approaches, better meeting students' needs and the demands of future society.

Performance Evaluator: Can provide instructors with targeted feedback and recommendations to guide adjustments to teaching methods to better meet students' learning needs and improve teaching effectiveness. Individualized academic and skills support can be provided to help maximize each student's potential.

IV. SCOPE AND DELIMITATIONS

This study aims to delve into the application of performance assessment methods in collegiate gymnastics courses. By dividing 30 students into an experimental group and 30 students into a control group, a 12-week teaching experiment was conducted. The experimental group received specific performance assessment instructional designs, while the control group continued with traditional teaching methods. The study encompasses a wide range of assessment dimensions, including learning interest, collaboration skills, motor skills, and comprehensive application abilities. This comprehensive understanding of the impact of different educational methods on student performance is achieved through the use of scales measuring learning interest and cooperation skills, as well as detailed scoring criteria for athletic abilities and comprehensive application skills.

Participants were selected from the College of Physical Education at Chengdu University. There were 30 students in the experimental group from the 2023 Class 1 and 30 students in the control group from the 2023 Class 2. The study involved a total of 60 students majoring in physical education, all of whom were taking their first gymnastics course.

V. RESEARCH INSTRUMENT

Combined with constructivist theory. By combing and summarizing the relevant references, summarizing and extracting the assessment indicators of performance assessment applied in the teaching of various disciplinary courses, the course teaching objectives and the structure of performance assessment application, and comprehensively considering the degree of correlation and internal logic of the indicators of performance assessment and gymnastics course. Based on the teaching of the gymnastics course, combined with the general objectives of the syllabus of the Gymnastics (1) course for Physical Education majors in the College of Physical Education of Chengdu University. It was determined that students were assessed in four aspects: students' learning interest, cooperation ability, motor skills, and comprehensive application ability.

A. Gymnastics Learning Interest Scale

Based on the references from "Research Methods in Physical Education" and the relevant Physical Education Learning Interest Assessment Scale compiled by Wang [8], as well as drawing inspiration from the College Students' Physical Education Learning Interest Assessment Scale developed by Gu and Xie [9], which have demonstrated high reliability and validity and have been widely used. Considering the characteristics of college students' physical and mental development and the teaching objectives of gymnastics courses, we have outlined items reflecting students' interest in gymnastics learning to create the "Gymnastics Learning Interest Scale". The scores from this assessment serve as an indicator of the research outcomes in this teaching experiment. Cronbach's alpha index was used to test the reliability of this questionnaire. By using SPSS26.0 software to analyze the data, $\alpha = 0.816$, which meets the reliability coefficient test greater than or equal to 0.7, indicating that the questionnaire is reliable and meets the test criteria.

B. Collaboration Skills Scale

The "Collaboration Skills Scale" developed by Li [10] at Central China Normal University was utilized. This scale comprises two aspects: collaborative awareness and collaborative skills. The Likert scale method was used for rating, ranging from "completely disagree" to "completely agree", with scores assigned from 1 to 4. Cronbach's alpha index was used to test the reliability of this questionnaire. By using SPSS26.0 software to analyze the data, $\alpha = 0.823$, which meets the reliability coefficient test greater than or equal to 0.7, indicating that the questionnaire is reliable and meets the test criteria.

All scales were distributed to the students in the gymnastics course via the WeChat platform, along with instructions for completion. They distributed and collected on-site to ensure a high rate of return and effectiveness.

C. Motor Skills Assessment Criteria

Before and after the experiment, students undergo skill assessments, primarily focusing on students' strength (Push-Ups) and flexibility (Seated Forward Flexion). The scoring was based on the "Gymnastics (1)" teaching outline's "Gymnastics Scoring Criteria".

D. Integrated Performance Abilities Assessment Criteria

Before and after the experiment, students undergo integrated performance assessments, primarily evaluating students' creative abilities, performance skills, and competition abilities in forming artistic routines. Scoring was conducted by inviting gymnastics course instructors to assess students based on the "Self-choreographed Movements Examination Scoring Criteria" from the "Gymnastics (1)" teaching outline.

VI. RESULTS, ANALYSIS, AND INTERPRETATION OF DATA

Tables I and II show the difference in the pretest scores of the control and experimental groups before the utilization of the performance assessment on the college gymnastics course.

TABLE I. DIFFERENCE IN THE PRETEST SCORES OF THE EXPERIMENTAL AND CONTROL GROUPS BEFORE UTILIZATION OF THE PERFORMANCE ASSESSMENT ON GYMNASTICS COUSE

	Group	N	Mean	Median	SD	SE
Learning Interest	Control	30	2.54	2.5	0.53	0.1
	Experimental	30	2.63	2.73	0.57	0.1
Collaboration Skills	Control	30	3.04	3.05	0.33	0.06
	Experimental	30	3.04	3.08	0.39	0.07
Motor Skills	Control	30	77.01	77.63	9.56	1.74
	Experimental	30	76.13	76	5.7	1.04
Comprehensive Application Abilities	Control	30	64.1	65	11.94	2.18
	Experimental	30	65.13	60	15.16	2.77

TABLE II. INDEPENDENT SAMPLES T-TEST ANALYSIS

	t	df	p	Interpretation	Decision
Learning Interest	0.57	58	0.569	Not Significant	Accept H0
Collaboration Skills	0.02	58	0.981	Not Significant	Accept H0
Motor Skills	0.43	58	0.668	Not Significant	Accept H0
Comprehensive Application Abilities	0.29	58	0.77	Not Significant	Accept H0

The independent sample t-test was performed to determine if there was a significant difference in the pretest scores of experimental and control groups before the implementation of performance assessment on gymnastics course. Since all the generated p -values are greater than the 0.05 level of significance, the researcher will not reject the null hypothesis. Hence, their pretest scores on learning interest ($t = 0.57, df = 58, p = 0.569$), collaboration skills ($t = 0.02, df = 58, p = 0.981$), motor skills ($t = 0.43, df = 58, p = 0.668$), and comprehensive application abilities ($t = 0.29, df = 58, p = 0.770$) are the same.

The results of this study indicate that, prior to the implementation of the intervention, both the experimental and control groups had comparable levels of enthusiasm toward acquiring knowledge in gymnastics, as well as proficiency in collaborative skills, motor skills, and comprehensive application abilities. Consequently, any observed variations in these factors after the intervention are less likely to be ascribed to initial differences in beginning scores between the two groups.

In addition, the absence of substantial disparities in pretest scores highlights the significance of guaranteeing comparability between experimental and control groups in

intervention research. Researchers can enhance the isolation of intervention effects and derive more precise conclusions regarding its efficiency in enhancing the desired outcomes by generating comparable baseline scores [11].

Tables III and IV show the difference in the post-test scores of the control and experimental groups after using the traditional performance assessment on the college gymnastics course.

TABLE III. DIFFERENCE IN THE PRETEST SCORES OF THE EXPERIMENTAL AND CONTROL GROUPS AFTER UTILIZATION OF THE PERFORMANCE ASSESSMENT ON GYMNASTICS COURSE

	Group	N	Mean	Median	SD	SE
Learning Interest	Control	30	2.55	2.63	0.37	0.07
	Experimental	30	3.29	3.33	0.37	0.07
Collaboration Skills	Control	30	3.11	3.08	0.25	0.05
	Experimental	30	3.35	3.43	0.32	0.06
Motor Skills	Control	30	80.39	80.38	9.37	1.71
	Experimental	30	86.9	87.5	5.36	0.98
Comprehensive Application Abilities	Control	30	70.13	70.5	6.25	1.14
	Experimental	30	87.03	88	4.73	0.86

TABLE IV. INDEPENDENT SAMPLES T-TEST ANALYSIS

	<i>t</i>	<i>df</i>	<i>p</i>	Effect Size	Interpretation	Decision
Learning Interest	7.77	58	<0.001	2.01	Significant	Reject H0
Collaboration Skills	3.32	58	0.002	0.86	Significant	Reject H0
Motor Skills	3.3	58	0.002	0.85	Significant	Reject H0
Comprehensive Application Abilities	11.81	58	<0.001	3.05	Significant	Reject H0

Tables III and IV provides a summary of how the post-test scores of the experimental and control groups differ after the utilization of the performance assessment on the gymnastics course. Since all the generated *p*-values from the independent sample t-test are lower than the 0.05 level of significance, it can be concluded that there is a significant difference among the variables. Specifically, post-test scores from the experimental group scored higher in collaboration learning interest ($t = 7.77$, $df = 58$, $p = <0.001$, $M = 3.29$), collaboration skills ($t = 3.32$, $df = 58$, $p = 0.002$, $M = 3.35$), motor skills ($t = 3.30$, $df = 58$, $p = 0.002$, $M = 86.90$), and comprehensive application abilities ($t = 11.81$, $df = 58$, $p = <0.001$, $M = 87.03$) than the post-test scores of the control group for 85 to 305%, based on the effect size.

The notable differences seen in post-test scores between the experimental and control groups highlight the efficacy of performance assessment in improving all facets of participant performance in the gymnastics course. The aforementioned studies conducted by Brown and Johnson [12] and Brown and Smith [13] underscore the significance of implementing structured evaluation and feedback mechanisms in fostering learning motivation, collaboration, motor skills, and comprehensive application abilities among individuals engaged in gymnastics courses.

VII. CONCLUSION

The implementation of performance assessment and feedback systems has proven to be successful in promoting good advancements. The study results emphasize the significance of performance assessment in improving participants' enthusiasm in learning and their ability to collaborate. The findings of this study hold significant significance for the development and execution of athletic training systems, underscoring the importance of integrating performance assessment methods to enhance participant outcomes. Athletic trainers and coaches can improve player engagement, motivation, and skill development in gymnastics and other sports by utilizing systematic evaluation and feedback methods.

VIII. RECOMMENDATION

Additional study is required to examine the enduring impacts of performance assessment treatments on participant outcomes within the realm of gymnastics and other sports environments. The utilization of longitudinal studies can offer valuable insights into the long-term viability of enhancements and the enduring effects of performance assessment on the development of participant skills and performance.

CONFLICT OF INTEREST

The author declares no conflict of interest.

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