

# The Construction of Scientific Knowledge System of Dance Teachers in General Institutions of Higher Education

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**Abstract:** Dance science remains a prominent topic within contemporary dance education, especially receiving considerable attention in the realm of dance professional education. However, as vital establishments for cultivating dance art talents, conventional higher education institutions demonstrate inadequacies in the dance science knowledge among dance educators, notably constraining their ability to cultivate specialized talents. Hence, there is a need to amalgamate theoretical knowledge from dance science research with the practical requirements of dance educators in these institutions to construct a dance science knowledge framework tailored for their use. This not only accentuates the research value of dance science but also aligns with the practical necessities of dance pedagogy. This paper proposes the construction of a scientific knowledge framework for dance educators, encompassing constituent elements of dance science knowledge and the integration framework of knowledge systems. Through leveraging the subjective initiative of dance educators, while simultaneously addressing the universal and individualized needs of students, it emphasizes the dual significance of theoretical foundations and practical applications to facilitate the establishment of a scientific knowledge framework for dance educators.

**Keywords:** General Institutions of Higher Education; Dance Teachers; Dance Science; Knowledge System.

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## 1. Introduction

Dance science is the scientific exploration of issues related to the scientific selection, training, and prevention of occupational injuries among talents engaged in dance art performance. Its research encompasses primarily two facets: firstly, investigating scientific theories and methodologies aimed at enhancing the efficiency of dance teaching and training; secondly, considering dance as a physical activity and studying its physiological and psychological impacts.[1] Dance science knowledge stems from addressing scientifically-oriented issues accumulated through practical experiences in dance. It represents an amalgamation of foundational knowledge across various disciplines, intersecting, infiltrating, and amalgamating within the field of dance studies. It incorporates fundamental concepts, principles, and methodologies from diverse disciplines, applied across various domains within dance studies, thereby generating novel theories and methodologies categorized under dance science within the field of dance studies.

## 2. The Issues Surrounding Scientific Knowledge Among Dance Educators in Chinese Conventional Higher Education Institutions

Since the establishment of the Dance Research Institute at Beijing Dance Academy in 1984, China has gradually unfolded research and teaching endeavors in dance science. This development has evolved into the country's sole institution offering a specialized direction in dance science at the higher education level, consequently leading the forefront of dance science development in China. The study of theoretical knowledge of dance science is the foundation of the scientific training of dance professionals, but at present, the curriculum construction of dance science in some colleges

and universities in China has not yet reached the expected goal. In 2017, Beijing Dance Academy began to recruit undergraduates in the direction of "dance science", adopting the teaching method of two years of dance history and two years of cross-study of dance science, which may solve the problems of teacher shortage and single knowledge structure.[2] In recent years, dance science has garnered widespread attention among higher education institutions. Various institutions specializing in arts, sports, and interdisciplinary studies have initiated relevant research in dance science. Significantly, these efforts have yielded notable achievements in multiple domains, underscoring the crucial importance of fostering the scientific development of contemporary dance art and dance education. Despite the flourishing landscape of dance science in China, there persists an insufficiency in dance science knowledge among dance educators in conventional higher education institutions. This shortfall extends to limitations in cultivating dance science specialized talents and inadequacies in understanding the scope of dance science training.

### 2.1. The Limited Availability of Specialized Talents in Dance Science

At present, the development of dance science in Chinese higher education institutions specializing in dance education exhibits an uneven trajectory. Compared to the widespread prevalence of dance science among faculty members in foreign universities, Chinese institutions remain relatively lagging in terms of their teaching staff in this field. The recruitment of master's students specializing in dance science is primarily confined to top-tier domestic dance academies, notably led by Beijing Dance Academy, while educators specializing in related fields of dance science within other academic disciplines predominantly integrate theories from sports science into dance education. The availability of specialized talents in dance science within conventional

higher education institutions is imperative for the widespread dissemination of dance science knowledge. The propagation of dance science knowledge predominantly relies on dance education within universities. However, due to the relatively recent emergence of dance science in China, comprehensive dissemination of dance science knowledge has yet to be achieved. Furthermore, considering the growing demand for dance science teaching, the current proportion of dance educators specializing in dance science fails to adequately meet the urgent requirements for dance science education.

## **2.2. The Deficiency of Scientific Knowledge Among Dance Educators**

In the specialized dance education system of conventional higher education institutions, dance science occupies an ambiguous position, primarily offering courses related to dance science to disseminate its knowledge. These courses often commence with foundational subjects such as dance anatomy, initiating dance science education at the basic level of human anatomical science. However, such an approach falls short in comprehensively shaping dance talents. Insufficient offerings of relevant dance science courses and the limited foundational knowledge of dance science among dance educators result in a weak knowledge base, lacking depth across various interdisciplinary domains. Consequently, these shortcomings significantly impede the scientific advancement of dance teaching and the dissemination of dance science knowledge. Moreover, dance educators encounter practical challenges in applying dance science knowledge effectively. Given this context, dance education within specialized programs necessitates leveraging dance science knowledge to cultivate well-rounded dance professionals equipped with a comprehensive knowledge structure, thereby better serving societal needs.

## **2.3. Inadequacies in Dance Science Training Awareness**

While dance science training has gained considerable traction in recent years, many dance educators in conventional higher education institutions lack adequate knowledge in dance science, hindering the effective implementation of dance science training. Simultaneously, a prevalent scenario persists wherein research-oriented dance science educators and instructors focusing on dance technical training operate separately, limiting opportunities for the integration of theoretical dance science with practical applications. Consequently, dance skill training often relies on traditional teaching methods, transmitted orally and through demonstration, rather than incorporating theoretical foundations of dance science. In comparison to institutions excelling in the development of dance science training, educators in conventional higher education institutions face limitations in applying dance science training effectively within teaching practices. The deficiency in essential cognitive awareness regarding dance science training prevails among these educators. Furthermore, a significant number of dance instructors continue to rely on traditional experiential teaching methods, hesitating to adopt dance science training as an inherent teaching approach. Consequently, many educators exhibit reluctance or fail to practically implement dance science training. It is imperative to bolster awareness of dance science training principles and familiarize educators with fundamental methodologies. Encouraging dance educators to engage in dance science training is crucial for

advancing the field.

## **3. The Relationship between Dance Science and Dance Teacher Pedagogy**

After years of academic research, dance science necessitates the development of a comprehensive knowledge framework applicable in dance education, thereby elevating the scholarly level of dance science research. Consequently, constructing a knowledge system in dance science for dance educators not only highlights the research value of dance science but also aligns with the practical needs of dance pedagogy. Dating back to the 18th century, dance masters began integrating scientific knowledge from physiological anatomy into dance, initiating interdisciplinary research between the art of dance and natural sciences. Rudolf Laban, a dance scientist, applied knowledge from mathematics, physics, dynamics, physiology, and other natural sciences to dance research, pioneering studies in human movement principles and Labanotation. This breakthrough held significant implications for the research of dance art, transforming dance studies from being exclusively a social science domain to garnering attention from natural science inquiries. As the scope of dance science research expanded, its pragmatic significance in contemporary dance education transcended beyond dance-specific training to encompass broader societal functions. Consequently, the inherent value of dance science itself has become an indispensable aspect for the ongoing development of dance art.

Although a relatively nascent field within dance studies in China, dance science has emerged as a significant domain in higher education institutions, yielding numerous theoretical achievements. Dance science training itself is a highly practical scientific research and teaching activities, theoretical results must withstand the test of practice to be popularized, although a number of dance science training theory results have been published, but due to the lack of practical experience, these results have not yet been generally applied to ordinary colleges and universities.[3] Faculty members within these institutions constitute pivotal figures in the realm of dance science research, functioning as the principal disseminators of dance science knowledge to students. They also employ this knowledge within teaching methodologies, bridging the critical juncture between the input and output of dance science research. Leveraging the academic advantage of efficient dance science research, these educators engage in comprehensive exploration from various perspectives, continuously innovating to generate new knowledge in dance science. This endeavor contributes to the refinement and supplementation of crucial areas within the discipline of dance studies. Consequently, the establishment of a comprehensive dance science knowledge system for dance educators stands as an urgent necessity within the sphere of higher education's dance science research.

The ultimate value of dance science knowledge hinges on its application by dance educators in practical teaching scenarios. Therefore, the possession of a reservoir of dance science knowledge by dance educators becomes an essential means to enhance the standards of dance education. The proficiency of dance educators in dance science directly impacts the success rate in cultivating skilled dancers within the dance discipline. Equipping dance educators with a wealth of dance science knowledge emerges as an intrinsic necessity

in constructing a comprehensive dance science knowledge framework for these educators. The capability of dance educators to effectively utilize dance science knowledge in dance pedagogy fundamentally embodies their teaching competencies.

The empirical approach in dance education represents an initial stage in the understanding of dance pedagogy, necessitating continual deepening to evolve into a universally applicable body of teaching knowledge. Conversely, scientific dance education involves the direct utilization of dance science knowledge by dance educators in the service of dance teaching. This is particularly crucial in light of the trend towards increased enrollment in undergraduate dance programs, where students graduating from general high schools enter dance majors without prior professional training but with already stabilized physical functionalitie. This scenario demands the application of dance science methodologies for effective dance pedagogy within these undergraduate dance programs. Hence, relying solely on experiential teaching methods is inadequate to meet contemporary teaching requirements. Dance educators should amalgamate experiential and scientific teaching approaches, harnessing rational dance science knowledge to reconstruct dance pedagogy. However, this prerequisite entails a substantial grounding in dance science knowledge for educators to proficiently and seamlessly integrate these methodologies, ensuring a harmonious alignment between teaching and knowledge.

The construction of a dance educator's dance science knowledge system involves the abstraction and systemization of dance science knowledge, leading to the formation of an individualized comprehension of dance science teaching methodologies. This approach is conducive to fundamentally enhancing the teaching capabilities of dance educators, facilitating the cultivation of dance talents, and fostering advancements in dance science research.

It is evident that establishing a comprehensive dance science knowledge system for dance educators maximizes the research value of dance science, fostering innovative research outcomes while catering to the practical needs of dance teaching. The creation of a dance science knowledge framework founded on dance science is imperative to fulfill the instructional requirements of dance educators. Dance educators must not only excel in teaching but also continuously enhance their learning by clarifying their comprehension of the dance science knowledge system. Only by doing so can they achieve higher levels of teaching proficiency and effectively nurture aspiring dance talents.

#### **4. Constructing the Scientific Knowledge System for Dance Educators**

Knowledge is disparate, fragmented, and sporadic, while a knowledge system involves integrating diverse knowledge into an organic system that forms a concrete knowledge structure with comprehensive coverage. Despite the ongoing expansion of dance science's research scope and the successive emergence of various theoretical achievements, a complete knowledge system has yet to materialize. Nevertheless, in response to the urgent demand among dance educators to enhance their knowledge framework by incorporating dance science, it is imperative to construct a structured framework tailored for dance educators. This

framework should utilize the wealth of dance science knowledge to create a comprehensive and specific architecture, subsequently applying it to dance pedagogy.

#### **4.1. The Constituents of Dance Science Knowledge**

The research scope of dance science predominantly encompasses several areas, including dance injury, dance wellness, nutrition and weight control, scientific training methodologies, principles of movement techniques, psychological therapy, and other related fields. This domain involves interdisciplinary subjects such as dance anatomy, dance physiology, dance mechanics, dance kinetic, dance medicine, dance psychology, and dance biochemistry.[4] Henceforth, dance science knowledge stands as the product of interdisciplinary research within the realm where dance studies intersect with other body-centered disciplines. It encompasses specialized knowledge from various theoretical frameworks across diverse academic domains within the realm of dance science research and its associated content. For instance, the concept of "skeletal muscles" is grounded in the knowledge of human physiological anatomy, elucidating the structure of skeletal muscles in different parts of the body, the principles governing muscle function, physical characteristics of muscles, and types of muscle fibers, among other fundamental aspects. When applied to dance anatomy, this knowledge delineates the working principles of musculature in bodily movement during dance, contributing to the analysis of dance movements by aiding dancers in identifying the primary muscles involved. Moreover, in the field of dance training, understanding the muscle characteristics serves as a foundation for strength training, distinguishing between static and dynamic muscle strength, and employing effective training methods according to the specific muscular requirements of dance movements. Within the interdisciplinary realm of dance science, knowledge synthesis emerges from the guidance provided by the theoretical underpinnings and methodologies of various disciplines, where the interconnection between different strands of dance science knowledge exists as both relatively independent and interconnected entities.

#### **4.2. Integration of Dance Science Knowledge System**

The construction of dance teachers' knowledge systems in dance science is predicated on the foundation of dance science theories, bifurcating into fundamental and applied theories. The fundamental theories encompass theoretical and practical knowledge in dance science, including the theory of dance science and practical knowledge. For instance, within "Dance Anatomy," the fundamental theories include human body structure and systems, particularly theoretical knowledge in joint anatomy and practical knowledge in dance action analysis, training for children, adolescents, and female dancers, and dancer fitness training. The applied theories within "Applied Dance Anatomy" employ dance anatomical knowledge in teaching and training dance movements by developing movement in various body parts to create dance combinations.

The theoretical and practical knowledge encapsulated within the fundamental theories of dance science underpins the formation of the dance science knowledge system. This includes knowledge concerning the physical and mental aspects of dance. Specifically, the body serves as the material

medium for dance artistry. Employing theories and methods from human body science, the study of dance human body science assists dance teachers in comprehending body structures, enhancing students' physical abilities, preventing potential injuries, aiding students in precise movement execution, understanding movement methods, and improving movement quality, concepts already widely employed in dance education both domestically and internationally. Psychological knowledge about dancers includes fundamental theories such as dance physiology and dance anatomy, covering knowledge about bones, skeletal muscles, energy supply, among others. Furthermore, understanding psychological aspects such as sensations, emotions, imagination, memory, and cognition as central facets of human dance expression is indispensable in dance teaching and learning. These psychological aspects directly impact dance artistry and instructional effectiveness. Therefore, teachers should acquaint themselves with psychological knowledge relevant to dance, including dance creative psychology and dance performance psychology, which includes knowledge about dance imagination, emotion, and thought processes. Dance teachers must grasp dance science knowledge not only by understanding fundamental theories but also by blending theoretical and practical knowledge to apply them effectively in dance teaching.

Applied knowledge within the dance science theoretical framework is determined by the curricula of various dance professional practice courses, leveraging the principles of human body movements for dance science training knowledge. Serving as a bridge between dance science knowledge and practical teaching, this applied knowledge underpins dance practice, while a dance teacher's professional training capability remains a pivotal benchmark for cultivating dance talent. This professional training involves specific technical knowledge and practical training methods. For instance, in teaching technical movements, adherence to teaching principles and the utilization of appropriate training methods based on technical knowledge empower students to acquire technical skills. Applied knowledge in dance encompasses biomechanics, nutrition, dance training, sports medicine, among other subjects, addressing areas like energy metabolism in dancers and weight control and reduction.

The incorporation of these diverse realms of dance science knowledge, whether applied individually or in combination, offers a multifaceted structure for dance teachers' dance science knowledge systems. Contemporary dance education demands a dance science knowledge system tailored for instructional use, emphasizing comprehensive knowledge integration and reinforcing interrelationships between different strands of knowledge. Such a system mobilizes dance teachers to foster the development of dance science knowledge, caters to their teaching needs, facilitate continuous innovation and refinement of dance science knowledge systems, and signifies self-improvement among dance teachers. The establishment of a dance science knowledge system lays a robust foundation for better teaching implementation in contemporary dance education.

### **4.3. The Implementation Path of Dance Science Knowledge System**

Constructivist theory provides theoretical support for individual knowledge learning and construction, offering new theoretical perspectives on cognitive processes and knowledge generation. The dance science knowledge system

is constructed based on dance science theories and practical knowledge, which is then applied by dance teachers in their teaching practices. However, the realization of knowledge system construction is an ongoing and evolving process rather than an immediate achievement. For dance teachers, the construction of the dance science knowledge system implies the need to effectively integrate dance science knowledge into dance teaching. This is crucial for enhancing the quality of dance instruction and constructing a knowledge system tailored to individual needs.

#### **4.3.1. Unleashing the Subjectivity and Agency of Dance Teachers**

Piaget's Constructivism proposes that learners do not passively receive knowledge but actively construct it as cognitive subjects.[5] Dance teachers' construction of a dance science knowledge system requires the expression of subjectivity and agency. This involves setting short-term goals and long-term planning to achieve a conscious construction of the dance science knowledge system. For dance teachers, integrating dance science into teaching requires a conscious effort. Strengthening dance science awareness and methods in teaching is contingent upon a foundation of dance science knowledge, and ongoing acquisition of this knowledge represents a conscious effort. In the era of the Internet, knowledge construction is no longer confined to traditional education. Leveraging applications related to dance science and Massive Open Online Courses (MOOCs) such as "Xuetang" and other resources can facilitate access to dance science knowledge. Using online platforms to gather dance science knowledge and interlinking independent units of knowledge contribute to the development of a comprehensive dance science knowledge system, stimulating the subjective agency of teachers. It presents the most convenient avenue for dance teachers to acquire dance science knowledge.

#### **4.3.2. Balancing Universality and Specificity for Students**

Dance teachers serve as the primary executors in nurturing dance talent, and the ultimate goal of constructing a dance science knowledge system for dance teachers is to serve dance education by fostering a greater number of exceptional dance artists. The dance science knowledge, derived from various disciplines, focuses on different aspects concerning distinct educational targets. For instance, in professional education, dance science knowledge encompasses dance selection, training methodologies, injury prevention, rehabilitation in dance, and Laban Movement Analysis. In contrast, general education includes social, national, and special group dance education. Given the differences among students in dance majors in conventional higher education institutions, constructing a dance science knowledge system requires considering both the universality for all students and the targeted approach for individual differences. Utilizing the advantages of dance science knowledge in teaching, dance teachers must proactively adapt to students' needs and construct their own dance science knowledge system.

#### **4.3.3. Balancing Theoretical and Applied Aspects of Knowledge**

Dance science knowledge is an essential subject matter that dance teachers at different levels should acquire, constituting an integral part of their knowledge structure. The knowledge framework of dance teachers encompasses both educational pedagogy and subject-specific teaching knowledge. In dance education, alongside mastering the basic laws of education

and teaching, instructors need to impart subject-specific knowledge to students. This domain includes dance's specialized skills and the principles of dance artistry. Mastery of dance expertise relies on specialized training in dance, which necessitates dance science knowledge as its foundation and assurance. Hence, dance science knowledge becomes a requisite subject matter for dance teachers.

The structure of dance science knowledge system necessitates dance teachers to develop theoretical and applied dance science knowledge, grounded in the disciplinary fundamentals, to enhance their own knowledge structure. Instructors should emphasize the concurrent importance of foundational theory and applied theory, highlighting the practical utility of knowledge itself, and not overlook the application of dance science knowledge in dance teaching.

## 5. Conclusion

In summary, contemporary dance education embodies a dual nature of both art and science. The ability of dance teachers to teach scientifically serves as a crucial metric for the scientific advancement of dance education. The systematization of dance science knowledge assists instructors in effectively mastering this knowledge, addressing teaching issues encountered in practical experiences, and transitioning from experience-based to

science-based teaching practices. However, the development of any knowledge system should undergo a dialectical development process, transitioning from general to specific, specific to the negation of the negation. Due to the varying foundations and diverse student populations among dance teachers, it is imperative to appropriately retain inclusivity within practical contexts, optimizing the knowledge system continually. The future of dance education is undoubtedly oriented towards a more scientific trajectory.

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