Inheritance of Intangible Culture Based on Wireless Communication Network in College Dance Teaching

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ABSTRACT

Intangible cultural heritage is an important part of Chinese excellent traditional culture, and college dance teaching is paid more attention by researchers of physical education and computer technology. In order to help the inheritance and development of non-legacy culture in college dance teaching, this paper analyzes the influencing factors of wireless communication network in college dance teaching, constructs an interactive platform for non-legacy digital dance teaching based on wireless communication network technology, and applies it in the dance teaching process of a university in Henan province to highlight the role of wireless communication technology in dance teaching. The results show that the interactive platform can effectively reduce teachers' physical energy consumption and has certain reliability and practicality. Through artificial intelligence algorithm, the traditional dance teaching method has been changed, and a new exploration of non-legacy dance teaching has been realized.

KEYWORDS

Dance Teaching, Intangible Cultural Heritage, Wireless Communication Network

INTRODUCTION

College dance teaching is in a period of reform. Dance education students mainly study the basic theory and skills of dance education. Students develop their abilities in artistic expression, independent dance teaching, music and dance analysis, creativity, performance, and counseling. Through systematic curriculum and teaching practice, university dance education is committed to cultivating students' all-around development, emphasizing improving their comprehensive quality and in-depth understanding

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of dance art. At the same time, with the changes in social needs and the development of the times, university dance education must constantly innovate to better adapt to future development trends and provide strong support for students' growth and career development. College dance teaching should re-examine itself from the aspects of the educational system, educational advantages, and educational development, and make changes, from the original closed school education to an open social education, from a unilateral book knowledge–based education to a comprehensive education encompassing virtue, intelligence, body, aesthetics, and labor. For preschool education majors, dance is a required course (Wang & Zheng, 2020). Dance is an essential spiritual activity that conveys beauty; therefore, dance courses in colleges and universities should be diversified, combined with sports, minority dances, games, and other content, to strive to be close to students' future careers and life, continuously improve the effectiveness of dance aesthetic education courses, and work hard to cultivate practical talents to meet the needs of social and economic development.

Moreover, college dance teaching belongs to the realm of higher education (Guo, 2020). Students are admitted to the school after the college entrance examination, and their age is similar to that of undergraduate students. After graduation, they will have various jobs and adapt their minds to different working environments (Schupp, 2010). Therefore, colleges and universities should pay close attention to aesthetic education, offering diversified dance courses to improve students' overall quality and train them in artistic quality. They should also cultivate students' creativity, enhance their adaptability and learning ability, and strengthen their competitiveness. This approach is practical for students' later life and career planning.

Diversified dance aesthetic education courses are an inevitable requirement for social progress and all-around economic development (Ma & Guo, 2019). The continuing reform of universities' dance curricula has gradually revealed the disadvantages of the previous education mode. For example, some universities only want to expand students' resources without paying attention to the quality of their education, resulting in increased employment pressure for some students after graduation (Chu & Feng, 2021). Therefore, universities have begun to pay attention to students' multi-directional development to avoid and overcome all kinds of drawbacks. For example, dance is a required course in preschool education. When taking dance courses, teacher-led theoretical education turns to practical education with students' development as the leading factor, paying more attention to cultivating students' creative spirit, thinking, and ability (You, 2009). Therefore, the teaching mode for dance courses has changed from simplification to diversified development, focusing on developing students' aesthetic education. In addition, students are encouraged to face society, create innovative teaching methods and curricula, and design a dance curriculum model for students' lifelong development. Under the diversified development of the dance curriculum mode, preschool education majors in colleges and universities take dance classes.

With the rapid development of wireless communication network technology, sports teaching researchers and computer technology researchers have highlighted the sports dance teaching system (Zhang et al., 2021). Artificial intelligence and Internet of Things technologies complement instruction in the new intelligent dance classroom. To provide comprehensive learning resources and precise learning data for dance instruction, teachers employ artificial intelligence technology, and students wear sensors. Wireless communication network technology can offer advanced and scientific training means for educators and dancers, enlarging the application scope of teaching. At the same time, the emulation of sports dance can also promote the development of computer technology (You et al., 2021). Wireless communication network technology uses computers to integrate various media, such as text, graphics, images, sounds, animations, and videos, and to process them by sampling and quantifying, editing and modifying, coding and compressing, reconstructing and displaying, and storing and transmitting to make them logically connected (Chowdhury et al., 2020). Due to its incomparable profits of convenience, accuracy, high efficiency, convenient storage, and easy modification, the computer keeps breaking records. Over the past few years, due to the quick development of wireless communication network technology and continuous software upgrades, the application of computers in design and performance has broadened. Multimedia technology has not only revolutionized stage visual representation in a new form but also significantly changed people's aesthetic concepts (Yue, 2018). Artificial intelligence has witnessed a remarkable transformation of non-legacy culture due to the swift advancement of wireless communication technology. The fashion communication of non-legacy culture has benefited from the "non-legacy + computer technology" communication paradigm.

Wireless communication networks provide new platforms and opportunities for transmitting and promoting intangible cultural heritage (ICH), but they also pose several challenges. A balance must be struck between the development of the digital age and the preservation of traditional culture to ensure that ICH is effectively passed on and sustained.

ICH belongs to the social humanities, but this field of humanities research attaches great importance to its operability, and the central task now involves how to protect intangible cultural content (Li & Li, 2021). The law of inheritance of ICH determines the law of protection of ICH, and the key lies in whether we can better inherit ICH. Society has entered the digital age, and people receive rich digital cultural information and enjoy unique digital cultural experiences (Wang, 2020). At the same time, digital technology has opened up a new path for the spread and development of ICH, leading ICH to appear in a more three-dimensional and diversified form, full of vigorous vitality (Wu, 2020). Against this background, exploring how to apply digital technology to the protection and inheritance of ICH and give full play to its advantages so that ICH can be carried forward and spread efficiently is a critical issue in the development of ICH today. It is also an urgent task to solve the inheritance of ICH in college dance teaching.

To sum up, to help the inheritance and development of non-legacy culture in college dance teaching, this paper first analyzes the influencing factors of non-legacy culture in college dance teaching, discusses the relationship between the influencing factors by using a wireless communication network, and constructs a simulation algorithm in dancer's movement editing, thus providing new ideas for college dance teaching. In Section 2, we introduce the related research status of wireless communication networks in college dance education. Section 3 examines the development of an interactive platform based on wireless communication network technology for non-legacy digital dance instruction. We discuss the auxiliary system architecture of dance choreography in non-legacy cultures in Section 4. Section 5 presents the results and discussion, and Section 6 offers a conclusion.

RELATED WORKS

With the rapid expansion of digital technologies and the beginning of the integration and development of culture and technology, a new trend to protect and disseminate ICH through the use of digital technologies has emerged (Zhang & Yang, 2021). The integration of ICH and digital technology has just started, and academic researchers and scientists working on ICH face new issues. We must urgently study how to make good use of digital technologies to disseminate and innovate ICH, enrich cultural diversity, achieve the mutual integration of different cultures, and allow the young generation to invest in the exchange and learning of ICH to better protect and transmit ICH (Cai et al., 2018).

The conservation and transmission of ICH today cannot be separated from digital technology. As modern media forms based on mobile media and digital production technologies such as virtual reality and enhanced reality continue to develop, the preservation and dissemination of intangible cultural traditions have undergone tremendous changes, providing more ways and a wider space for the inheritance and promotion of ICH today. Based on in-depth research and data analysis, this paper offers a systematic genealogy and study of the connotation, classification, and dissemination value of ICH. Then, it explores the cultural phenomena embedded in ICH and its driving force for today's cultural development. At the same time, the advantages of modern digital production technology platforms are fully utilized to incorporate digital technology with representative non-tangible culture.

Throughout its development, wireless communication network technology has shown obvious advantages, and the wireless communication network has many merits. Its most prominent function is its ability to compress a large amount of data and correct errors in the data. Moreover, if the data is transmitted on highly complex or essential channels, the importance of these two functions is revealed (Islam & Jin, 2019). In addition, it offers several advantages: First, wireless communication network technology can simply and quickly convert images, texts, audio, and wireless communication network information in two directions, and the public can convert these images, sounds, texts, and other information into wireless communication network information through wireless communication network-related equipment for an unlimited time, and vice versa (Bakare & Enoch, 2019). Compared with the complicated traditional steps, it is both convenient and efficient. Secondly, wireless communication network technology can conveniently modify, edit, delete, and back up data and information. Compared with the traditional working procedure, it is not only concise but also time-saving and labor-saving. Third, the high-speed network can be used for fast transmission to share resources. As long as one has a network terminal device, one can receive and send wireless communication network information at a high speed anywhere at any time. Fourthly, the collected information content is easier to retrieve. Modern information resources are extremely rich. Faced with a large number of information databases, the related instruments of wireless communication network technology can easily retrieve and use information, and at the same time, they can directly access and collect the content they need through the network without any time and space constraints (Idowu-Bismark et al., 2019).

This study explores the application of ICH heritage in university dance teaching based on wireless communication networks. Through the introduction of wireless communication network technology, we have organized cross-regional and cross-cultural dance exchanges and cooperation, expanded students' scope of learning and interaction opportunities, and simultaneously realized the sharing and interaction of dance teaching resources. In addition, we provide systematic evaluation indexes and quantitative analysis methods, which can objectively assess the effect and impact of wireless communication networks in dance teaching. Our study fills the research gap in the existing literature on the application of wireless communication networks in dance teaching. It provides an innovative teaching model and practical experience for university dance teaching.

The existing research has the following deficiencies in terms of the transmission of ICH based on wireless communication networks in university dance education: a lack of in-depth exploration of specific applications of wireless communication networks in dance teaching, a lack of large-scale practical cases and case studies of actual teaching applications, and a deficiency of interdisciplinary research perspectives. At the same time, there is a lack of systematic evaluation indexes and quantitative analysis methods and insufficient application and promotion of research results in actual teaching.

CONSTRUCTION OF AN INTERACTIVE PLATFORM FOR NON-LEGACY DIGITAL DANCE TEACHING BASED ON WIRELESS COMMUNICATION NETWORK TECHNOLOGY

Functional Requirements of an Interactive Platform

Interaction is a crucial element influencing the process and outcome of teaching. Since the introduction of wireless communication technology, teachers and students have disrupted the traditional interactive dance education model. Wireless communication technology equipment facilitates teacher–student interaction and instruction. It also provides students with interactive learning materials. No research consensus has been reached, and academic circles have had little influence on the dynamics between instructors and students when teaching using wireless communication technology. This essay also addresses how teaching dance using wireless technology affects the dynamic between instructors and students and whether teachers of various skill levels can use wireless technology to enhance their students' learning experiences. This inquiry aims to disclose how organizations can employ wireless communication technology to attain the best possible outcome in teaching dance.

Wireless sensor networks can provide a large amount of real-time and redundant environmental information, which can compensate for the limitations of the dance decision-making system itself and help improve the collaboration and efficiency of the dance decision-making system (Lucas-Estañ et al., 2018). However, the sensor information domains gathered around the nodes of the wireless sensor network may have overlapping and blind spots in information collection. Different from wireless sensor networks, multi-robots have flexibility, which can eliminate this blind spot for wireless sensor networks and fill the information gap. Meanwhile, to meet the needs of multiple users for data retrieval, analysis, and integration and to execute the commands issued by users in time, a real-time display control interface is needed to complete the control of the whole wireless sensor network and dance assistant decision-making system. This is called a multifunctional control terminal (Jiang & Wright, 2018). The overall structure of the platform is shown in Figure 1.

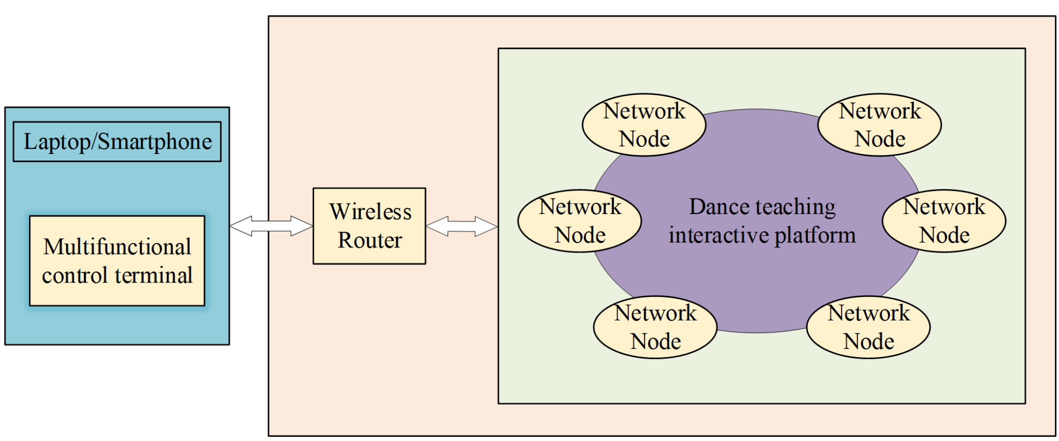
The dance teaching interactive platform based on a wireless sensor network environment needs to fulfill three basic functions, namely, a wireless sensor network that can dynamically network, an interactive teaching platform that can detect surrounding information and execute user actions, and a control system based on multiple functional platforms that can control the whole architecture, display sensor information, and send execution instructions.

Wireless Sensor Network Module

A wireless sensor network consists of many low-power and low-cost miniature wireless sensor network junction points deployed in the surveillance region. It integrates modern networks, sensors, wireless communication, and embedded technology and has a high degree of technical integration and interdisciplinary characteristics. Wireless sensor network nodes form a wireless sensor network through wireless mode, self-organization, and multi-hop to realize the data acquisition and monitoring of the monitoring area or the detected object (Pan et al., 2018).

In practical applications, hundreds of sensor nodes can be randomly arranged in the required places. After a certain period, information transmission paths between any two nodes can be established between each node according to a specific protocol, so the information of other sensor nodes can be obtained through any sensor node. Therefore, we need a wireless sensor network that can achieve maximum flexibility at the lowest cost, to which any terminal equipment with communication needs can be connected (Lyczkowski et al., 2019).

Figure 1. Overall Structure of Interactive Platform



Multifunctional Control Terminal

The system must establish a multi-functional control terminal to monitor and take over the overall operation status of the wireless sensor network and teaching interactive platform. As embedded hardware technology develops rapidly, mobile smart devices (such as cell phones, tablet PCs, and laptops) are widely used due to their superior performance and physical senses. Therefore, it is imperative to develop applications based on mobile smart devices. The Android-based control terminal enables mobile users to monitor the dance-assisted decision-making system anytime and anywhere; the C/S architecture-based control terminal can give full play to the processing power of the client PC and improve the client's response speed.

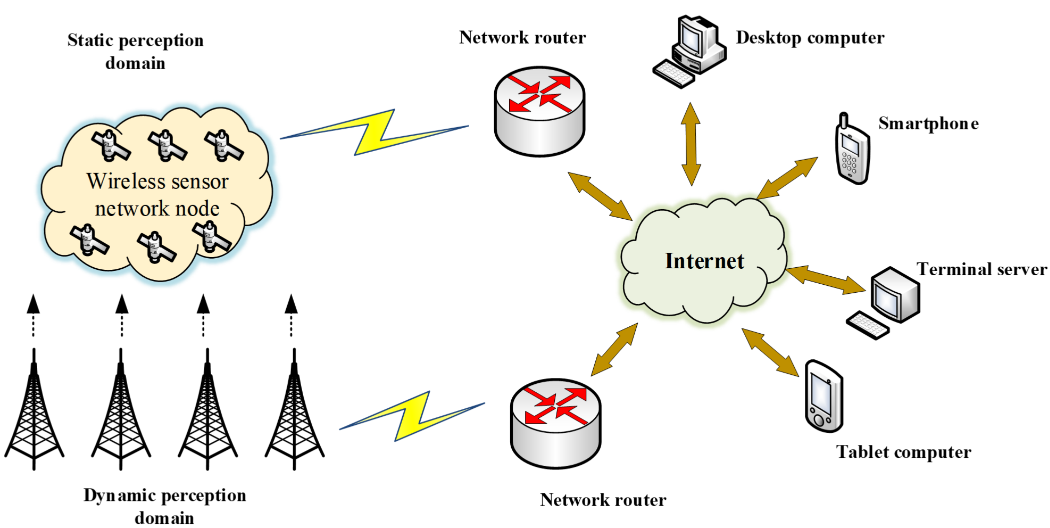
Overall Framework of Teaching Interactive Platform

In building the system model, a wireless router must be used to carry out the data networking function. A wireless router combines the wireless sensor network node, dance assistant decision system, and multifunctional control platform. In this way, we constructed the design of the whole framework of the teaching interaction platform based on a wireless sensor network. The system information interaction framework diagram is shown in Figure 2.

In the framework, the interactive platform's overall structure can be divided into the static sensing domain, dynamic sensing domain, network router, smartphone, data server, and end-user according to the sensing regions of functional nodes.

1. Static sensing domain
   The static sensing domain refers to the data-sensing area of wireless sensor networks. The static sensing domain completes data acquisition, transmission, and processing functions through the multi-functional acquisition nodes distributed in it (Salih et al., 2020). It mainly includes Wi-Fi network nodes, Zigbee network nodes, RFID read-write devices, and sensors with various functions. The number and scope of nodes determine the sensing range of the static sensing domain. In this area, the sensing environment data is relatively single and fixed. Therefore, users' ability to perform tasks in the static sensing domain is relatively fixed.
2. Dynamic perception domain

Figure 2. System Information Interaction Framework Diagram



The so-called dynamic sensing area is where the dance assistant decision-making system senses the surrounding environmental information in a small range according to its sensors (Ali et al., 2020). Compared with the static sensing domain, the dynamic sensing domain is more flexible in sensing environmental data because of its flexibility. In addition, the sensors and actuators carried by the dance assistant decision-making system can be replaced at any time, so the types of perception and execution in the dynamic perception domain are more diverse and dynamic.

3. Wireless router

The wireless router is the data transfer station of the whole architecture. The static sensing domain data sensed by the wireless sensor network and the dynamic sensing domain data sensed by the dance assistant decision-making system cannot directly access the Internet. Instead, they must access the Internet through a wireless router and be displayed to the end user control system (Gupta et al., 2018). Similarly, the instruction data issued by the user control system, if it wants to be distributed to the wireless sensor network or the dance assistant decision-making system through the Internet, also needs to be converted into wireless Wi-Fi signals by the wireless router to complete the instructions conveyed by the user.

4. Mobile phone user terminal

A mobile phone terminal is a typical device that uses embedded application technology to satisfy mobile terminal users' monitoring and management of sensor data. Using the Android system programming method to write a user APP program through this terminal technology can allow users to complete remote monitoring conveniently.

5. Data server

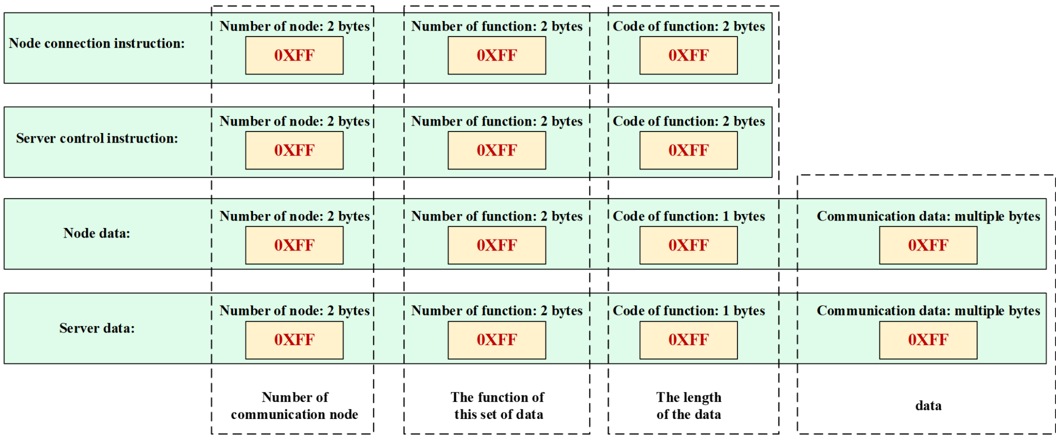
A data server comprises one or more computers running in LAN and database management system software. It can provide services for client applications, such as query, search, update, multi-user access control, transaction management, security, and caching. The data server can receive and record sensor data information and organize and manage these data information in the form of a command line. In addition, through C/S architecture programming to complete the interface information processing, users can more intuitively realize the management of the whole system.

Data Communication Protocol Architecture

In the interactive platform of a dance assistant decision-making system based on a wireless sensor network, the perceptual data and control data among nodes are transmitted and output in the form of information flow (Bahlke et al., 2018). The interactive process of information flow is realized by wireless networking. In data transmission, we must ensure the real-time validity of the data, especially the user's operation command data. We must ensure that the user's command can be wholly and successfully sent to the designated terminal and that the designated operation can be completed. Therefore, the data format should be specified. The specific data instruction format is shown in Figure 3.

In this interactive platform, the data communication protocol mainly includes two parts: the instruction format and the data format. The instruction format is designed for the user's control command of the whole platform, while the data format is designed for the sending and receiving of sensor information data in the wireless sensor network and dance assistant decision system. However, whether it is the instruction or data format, the connection between the server and the client must be established (Zhu et al., 2019).

Figure 3. Schematic Diagram of Data Instruction Format



AUXILIARY SYSTEM ARCHITECTURE OF DANCE CHOREOGRAPHY IN NON-LEGACY CULTURE

Dance Choreography Auxiliary System

As shown in Figure 4, the auxiliary system is divided from top to bottom into a user layer, a toolset layer, and a data layer. When designing a movement for each piece of music, the dancer first specifies the "high difficulty movement" for the critical moment according to the music genre of the piece and then uses the "movement retrieval" module of the toolset layer to select the "high difficulty movement" from the data layer.

Virtual Dance Movement Control

The motion control of virtual humans comes from the development of computer graphics and image technology. The early virtual human was similar to the virtual animal characters in cartoons, and then it was slowly applied to human models. For quite a long time, virtual people could only do extremely simple actions, and a significant gap remained between the degree of simulation of pictures and real-life videos. It was not until the appearance of virtual reality technology (a branch of computer graphics) that virtual people felt "immersed" in the complexity of actions, the simulation degree of the environment, the introduction of sound, and the coordination and consistency of sound action. This paper addresses the issue of animation frame jumping caused by a single interpolation algorithm using quaternion spherical interpolation and linear interpolation to interpolate the captured motion information. The result is a final synthesized human animation that is realistic, smooth, and natural-looking.

Motion Control Based on Quaternion Interpolation

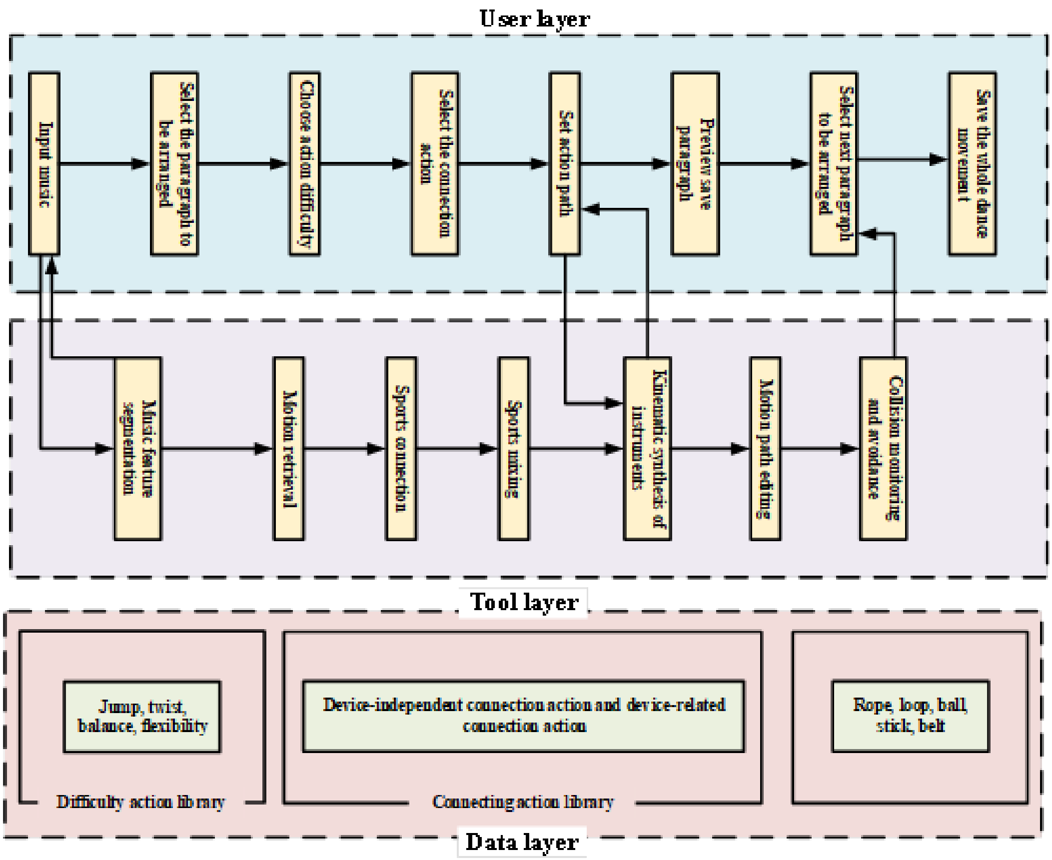
Quaternion is a super complex number with three imaginary units and one real unit, which can represent the position change of three-dimensional space, namely:

$$x = a + b * i + c * j + d * k \tag{1}$$

where i, j, and k are imaginary units in three vertical directions.

Let Q be the vector space based on the real number field R, and its orthogonal bases are:

Figure 4. Overall Structure Diagram of the Auxiliary System for Choreography of Dance Movements in Non-Legacy Culture



$$\begin{cases} e = (1,0,0,0) \\ i = (0,1,0,0) \\ j = (0,0,1,0) \\ k = (0,0,0,1) \end{cases} \tag{2}$$

Then, any element q in Q can be expressed linearly based on e, i, j, and k lines. We can assume that

$$q = [S,V] = a_0 e + a_1 i + a_2 j + a_3 k \tag{3}$$

where the vector part $\boldsymbol{V}$ is

$$V = \left(a_1, a_2, a_3\right) \tag{4}$$

and the scalar part $\boldsymbol{S}$ is

$$S = a_0 \tag{5}$$

The quaternion operation satisfies the additive commutative law and the associative law but does not satisfy the commutative law. In particular, the rotation of the angle θ around the unit axis n can be expressed as:

$$q = \left[\cos\frac{\theta}{2}, n\sin\frac{\theta}{2}\right] \tag{6}$$

Editorial Analysis of Virtual Dance Movement

If we let the rotation angles of q around the x, y, and z axes be θ_1, θ_2, and θ_3, respectively, and the corresponding quaternions are $q\theta_1$, $q\theta_2$, and $q\theta_3$, then it can be known from Equation 7 that the quaternion corresponding to Euler angle is Equation 8.

$$R_q(p) = qpq^{-1} \tag{7}$$

$$q = q\theta_1, q\theta_2, q\theta_3 = \left[\cos\frac{\theta_3}{2}, \left(0, 0, \sin\frac{\theta_3}{2}\right)\right]\left[\cos\frac{\theta_2}{2}, \left(0, \sin\frac{\theta_2}{2}, 0\right)\right]\left[\cos\frac{\theta_1}{2}, \left(\sin\frac{\theta_1}{2}, 0, 0\right)\right] \tag{8}$$

$$q = \left[\cos\frac{\theta}{2}, n\sin\frac{\theta}{2}\right] = [w, (x, y, z)] \tag{9}$$

$$\begin{cases} w = \cos\frac{\theta_1}{2}\cos\frac{\theta_2}{2}\cos\frac{\theta_3}{2} - \sin\frac{\theta_1}{2}\sin\frac{\theta_2}{2}\sin\frac{\theta_3}{2} \\ x = \cos\frac{\theta_1}{2}\cos\frac{\theta_2}{2}\sin\frac{\theta_3}{2} + \sin\frac{\theta_1}{2}\sin\frac{\theta_2}{2}\cos\frac{\theta_3}{2} \\ y = \cos\frac{\theta_1}{2}\sin\frac{\theta_2}{2}\cos\frac{\theta_3}{2} + \sin\frac{\theta_1}{2}\cos\frac{\theta_2}{2}\sin\frac{\theta_3}{2} \\ z = \sin\frac{\theta_1}{2}\cos\frac{\theta_2}{2}\cos\frac{\theta_3}{2} + \cos\frac{\theta_1}{2}\sin\frac{\theta_2}{2}\sin\frac{\theta_3}{2} \end{cases} \tag{10}$$

According to Equation 11:

$$R_q(p) = [0, r\cos\theta + (1 - \cos\theta)(n \cdot r)n + (\sin\theta)n \times r] \tag{11}$$

The corresponding rotation matrix can be calculated as follows:

$$M = \begin{bmatrix} M_{00} & M_{01} & M_{02} \\ M_{10} & M_{11} & M_{12} \\ M_{20} & M_{21} & M_{22} \end{bmatrix} = \begin{bmatrix} 1 - 2y^2 - 2z^2 & 2xy - 2zw & 2xz + zwy \\ 2xy + 2wz & 1 - 2x^2 - 2z^2 & 2yz - 2wx \\ 2zx - 2wy & 2yz + 2wx & 1 - 2x^2 - 2y^2 \end{bmatrix} \tag{12}$$

According to Equation 12, the trace tr***(M)*** of the rotation matrix ***M*** is:

$$\left(1 - 2y^2 - 2z^2\right) + \left(1 - 2x^2 - 2z^2\right) + \left(1 - 2x^2 + 2y^2\right) = 3 - 4\left(x^2 + y^2 + z^2\right) \tag{13}$$

Since q must be a four-digit unit, that is:

$$x^2 + y^2 + z^2 + w^2 = 1 \quad (14)$$

Therefore, we obtain:

$$tr(M) = 4w^2 - 1 \quad (15)$$

RESULTS AND DISCUSSION

To understand the role of wireless communication in the inheritance of dance teaching, we analyzed the role of a wireless communication network in a university in Henan province using a questionnaire survey. We conducted in-person research and interviews between December 2021 and April 2022, using a questionnaire platform to administer an electronic survey to a random sample of colleges and universities about the use of wireless communication network technology in dance education. Our purpose was to provide technical support for the interaction between teachers and students, to ensure teaching effectiveness, to improve learning efficiency, and to ensure the inheritance of intangible culture. The research object included professional dance teachers in selected universities. Eight teachers participated in the experiment, including four female and four male teachers, each accounting for 50% of the total. Before the experiment, to further understand the influence of teachers' use of wireless communication network technology to assist in dance teaching, we specifically considered teaching level and ability when selecting teachers. Referring to Figure 5(a), the eight teachers are distributed according to three levels of ability, including novice junior teachers (two, accounting for 25% of the total), experienced intermediate dance teachers (four, accounting for 50% of the total) and expert-level senior dance teachers (two, accounting for 25% of the total).

After selecting the eight teacher candidates, we divided them into groups evenly according to their teaching ability. The experimental and control groups contained one junior teacher, two intermediate teachers, and one senior teacher. No statistical difference ($P > 0.05$) in age, teaching experience, BMI, or other data exists between the teachers in the experimental and control groups, which is not comparable. The teachers' basic information is shown in Figure 5(b).

The Influence of Wireless Networks on Senior Teachers

Comparison of Calorie Consumption of Senior Teachers

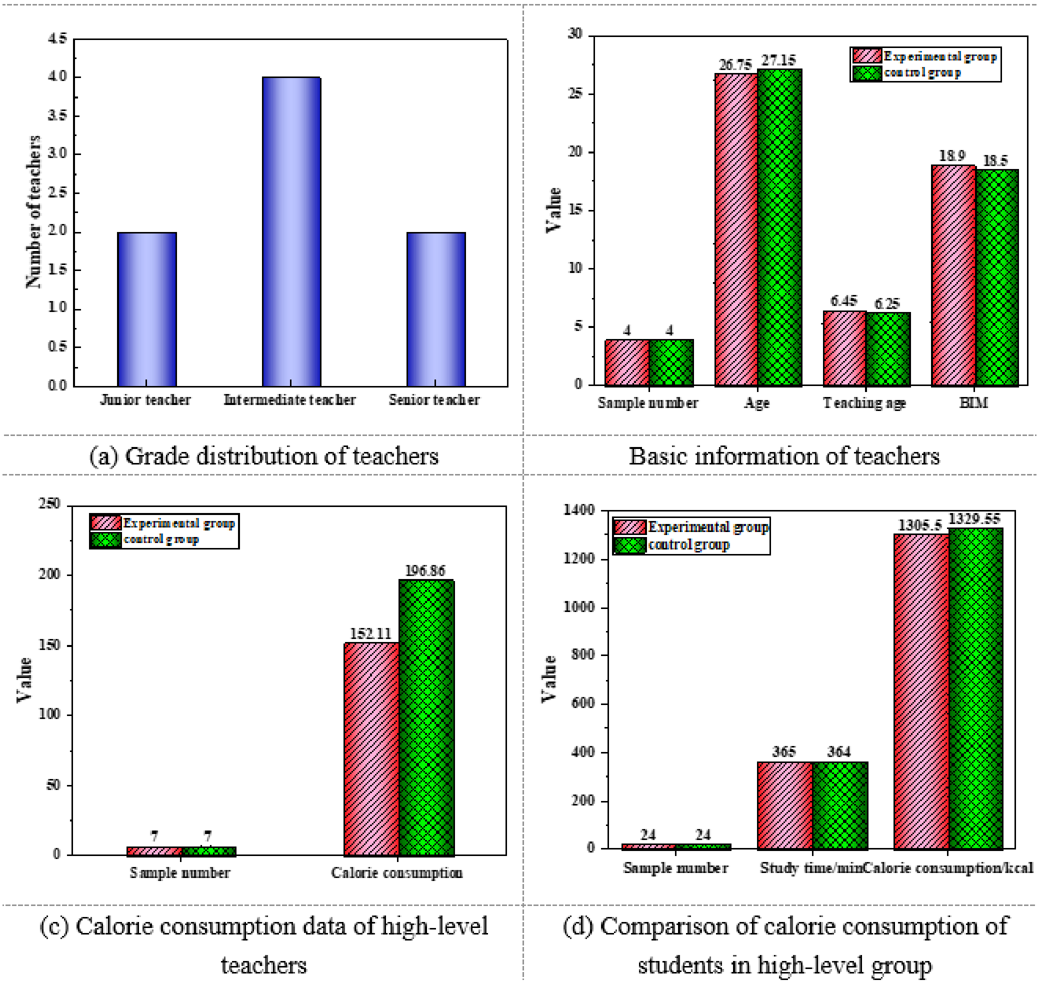
Figure 5(c) shows the calorie consumption data for the high-level teachers in the experimental and control groups. The average calorie consumption of the high-level teachers in the experimental group is 152.11±32.92 kcal/h, and that of the control group is 196.86±37.11 kcal/h, with a P value of less than 0.05, which indicates a significant difference between the high-level teachers in the experimental group and the control group. In addition, the calorie consumption of the high-level teachers in the control group is higher than that of the experimental group. After using wireless communication network technology to assist in dance teaching, the calorie consumption of high-level teachers also shows a downward trend.

Comparison of Calorie Consumption of Students in High-Level Group

In this experiment, the high-level teachers in the experimental group and the control group completed all the teaching tasks within seven class hours, and the teaching progress of the two groups was

Figure 5. Teacher Characteristics and Calorie Consumption

Note. (a) Grade distribution of teachers, (b) teachers' basic information, (c) calorie consumption data for the high-level group, (d) calorie consumption comparison for students in the high-level group.



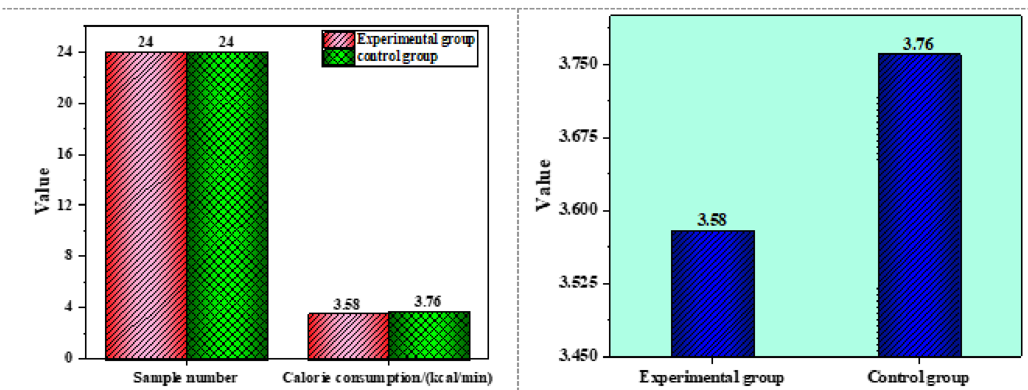
completely consistent. The high-level group completed the teaching of 13 dance knowledge points and collected the calorie consumption data of the students for these 13 knowledge points, obtaining 48 pieces of data. Figure 5(c) shows the total study time and average calories consumed by the experimental and control groups in all courses. Comparing the study time of the two groups, the study time of the control group was 354 minutes, slightly less than that of the experimental group's 365 minutes. From the point of view of total calories consumed, the control group's 1329.55±11.26 calories are also higher than the experimental group's 1305.50±25.41 calories, indicating that the students in the control group consumed more calories in less time. The data in Figure 5(d) shows that students' calorie consumption is higher in dance classes without wireless communication network technology.

Figure 5(d) shows the experimental and control groups' average calorie consumption per minute. The P value of the data of the two groups in the table is less than 0.05, indicating a significant difference in calorie consumption per minute between the two groups. The average consumption of 3.58±0.07 calories per minute in the experimental group is lower than that of 3.76±0.32 calories per minute in the control group, indicating that the students in the control group consume more calories per minute than those in the experimental group. Combining Figure 5(d) and Figure 6(a), after using the wireless communication network technology, the learning efficiency of the students in the high-level group generally shows a downward trend, while the senior teachers who do not use the wireless communication network technology let the students consume calories more efficiently during the teaching time.

This section verifies the data comparison of students' learning quality after the teachers of the high-level group use artificial technology. Taking the students' knowledge score data as the evaluation data of teaching quality, we selected the students' classroom scores of the high-level group in the control experiment for statistical analysis. Firstly, we carried out the normality test of the score data, and we found that the two groups of data did not obey the normal distribution. Then, we performed the rank sum test on the scores of students with senior teachers. Considering the variable of course difficulty, the course scores of the students taught by two groups of senior teachers are tested in groups of difficulty. Table 1 shows the statistical results, which indicate no significant difference in the distribution of students' scores for simple, medium, and difficult dance moves. This suggests that senior teachers' use of the technical assistance of human wireless communication networks does not influence students' overall class scores.

Figure 6. Calorie Consumption

Note. (a) Average calorie consumption per minute, (b) calories consumed by students of two groups of senior teachers.



(a)The average calorie consumption per minute

(b) Calories consumed by students of two groups of senior teachers

Table 1. Rank Sum Test of Students' Scores in the High-Level Group of the Control Experiment

Grouping Category	Simple		Medium		Difficulty	
	Number	Score	Number	Score	Number	Score
Experimental group	40	8.00[8.00,8.00]	32	8.00[8.00,8.00]	32	8.00[7.00,8.00]
Control group	40	8.00[8.00,8.58]	32	8.00[8.00,8.00]	32	8.00[7.50,8.00]
z	–1.87		–0.32		–0.96	
p	0.06		0.75		0.34	

Analysis of the Influence of Wireless Network Technology on Senior Teachers

This section compares advanced teachers' use of wireless communication network technology with conventional teaching in terms of (1) teachers' calorie consumption, (2) students' calorie consumption, and (3) a comparison of students' rating data. We then discuss the influence of wireless communication network technology on high-level teachers and students based on these three dimensions.

Regarding teachers' calorie consumption, Figure 6(b) clearly shows that after using wireless communication network technology to assist teaching, senior teachers' physical energy consumption is significantly reduced compared with those without wireless communication network technology. Based on our course observations, when wireless communication network technology is introduced into a dance class, teachers can let students watch video or animation teaching with the help of technology. This means the teachers no longer need to demonstrate their actions physically, thus reducing their calorie consumption. This also aligns with the fact that tools, machines, and even technology are extensions of human organs. Using machines can conserve people's physical strength and allow them to achieve efficient results.

Students consume a significant amount of physical energy while learning dance movements. This study aimed to determine whether the wireless communication network technology affects students' calorie consumption after joining dance teaching and whether teachers can lead students to consume more calories with the help of technology. Figures 5(d) and 6(a) use histograms to show students' average per-minute calorie consumption in the two high-level groups. Referring to Figure 6(b), when all lectures are consistent, senior teachers consume 3.76 kilocalories per minute without wireless communication network technology. When senior teachers use wireless communication network technology, students consume fewer calories per minute, which shows that using wireless communication network technology actually inhibits the calorie consumption of both teachers and students.

By observing the classroom, we determined why students' calorie consumption is reduced when using wireless communication network technology. In particular, the teaching mode changes when using this technology, with students watching animation or learning dance moves via video. We noticed that the screen easily attracts students' attention. On the one hand, the wireless network technology makes the students' attention highly concentrated; on the other hand, the students become addicted to the animation content and no longer follow the video exercises. Compared with the advanced class that does not use wireless communication network technology, when the teacher demonstrates the action, the students subconsciously follow the teacher's beats to imitate the action. At the same time, senior teachers who do not use wireless communication network technology often use beats to make students dance in class. Beat teaching is faster and more efficient than operating equipment, so students who do not use wireless communication network technology equipment consume more calories. This also shows that although wireless communication network technology attracts students' attention and increases their interest in learning, the cost is that it leads students to indulge in the teaching content, which leads to less calorie consumption. If students are addicted to animated content, this can be addressed by guiding students to establish good study habits, providing rich learning resources, and creating positive learning resources. Educating students about the importance of time management, among other measures, provides a solution. These methods help students' personal development and are more conducive to their future success in work and life.

Analysis of the Influence of Wireless Communication Network Technology on Teachers of Middle-Level Group

Since the teaching content of senior teachers and intermediate teachers is not entirely consistent, to determine the calorie consumption of the students in the high-level group and the middle-level group, we eliminated the redundant teaching content in the high-level group, retaining the same dance knowledge points of the two groups as data sources. At the same time, because the inconsistency in teaching time affects data accuracy, we measured students' calorie consumption as the average calorie consumption of the total sample. After testing the normality of the data of intermediate and advanced students in the experimental group (see Figure 7(a) for details), the P values of both data groups are greater than 0.05, indicating that both groups of data are normally distributed.

We tested the calorie consumption per minute of the two groups of students using a t-test of independent samples. As shown in Figure 7(b), the average calorie consumption of the students in the middle-level group is 2.81±0.09 calories per minute, and that of the students in the high-level group is 3.43±0.05 calories per minute. The average calorie consumption P-value of the two groups is less than 0.05, which indicates significant differences between the two groups. When using wireless communication network technology, students in the high-level group consumed more calories. This shows that when using wireless communication network technology, senior teachers lead students to burn more calories than intermediate teachers.

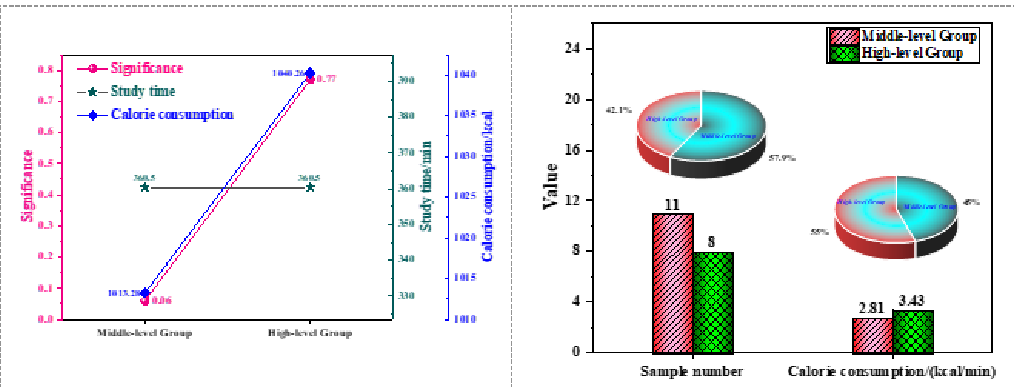
The Influence of Wireless Communication Networks on Low-Level Teachers

In this experiment, the low-level and middle-level students in the experimental group showed consistent learning progress, and the instructors all completed the teaching of 11 knowledge points. Therefore, we selected the calorie consumption of students with 11 knowledge points and carried out the normality test first. Figure 8(a) shows the test results of the normality of the two groups of data, in which the average calorie consumption of the students in the low-level group is 959.37±24.54, and that of the students in the middle-level group is 1013.28±32.84. From the data level, we found certain differences in calorie consumption between the two groups. Through the normal test of the two groups of data, the significance of calorie consumption of the students in the low-level and middle-level groups is greater than 0.05, which means that the two groups of data conform to the normal distribution. Then, we subjected the two data groups to the t-test of independent samples.

Before the t-test, we preprocessed the data. The logic of data processing is that the teaching time of the low and middle-level students in the experimental group is different, and the calorie data will be different due to the amount of practice time, so the average calorie consumption per minute is used as the statistical data. Figure 8(b) shows that the average calorie consumption P of the two groups

Figure 7. Calorie Normality for High- and Middle-Level Groups

Note. (a) Test of calorie normality for students in the high-level and middle-level groups, (b) calorie normality test of high-level and middle-level students in the experimental group.



(a) Test of Calorie Normality of Students in High-level Group and Middle-level Group

(b) Calorie normality test of students in High-level group and Middle-level group in experimental group of students is less than 0.05, indicating that the difference between the two groups is statistically significant. This shows that intermediate teachers' students' average calorie consumption per minute is higher than that of junior teachers' students when wireless communication network technology is used to assist teaching. It further reveals that junior teachers cannot make students consume more calories by using wireless communication network technology.

CONCLUSION

This paper highlights the role of wireless communication technology in dance education by building an interactive platform for non-legacy digital dance teaching based on wireless communication network technology, analyzing its internal basic principles using the dance movement assistant system, and applying it to a university in the province of Henan. We reached the following primary conclusions:

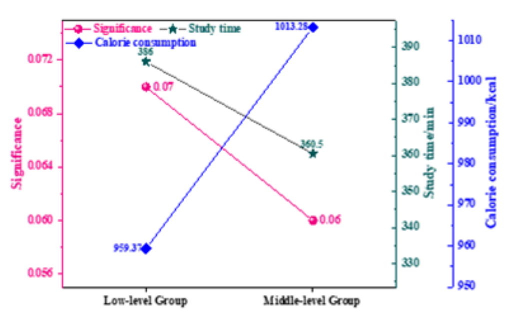
(1) We demonstrated that senior teachers' calorie consumption dramatically decreases when they use wireless communication network technology based on a comparison of the calorie differences between traditional and wireless teaching methods. As a tool, it can efficiently lower users' and teachers' calorie consumption, facilitating their physical completion of courses.
(2) Based on observations made in the classroom, the original teaching approach was modified using wireless communication network technology. Students can view movies and animations for action learning thanks to the instructor's wireless communication network technology's built-in animations and films. Instructors only need to correct their students' dancing. This type of instruction has disrupted the conventional dance education model and, to some extent, opened up new avenues for research into the instruction of dance from ICH.

COMPETING INTERESTS

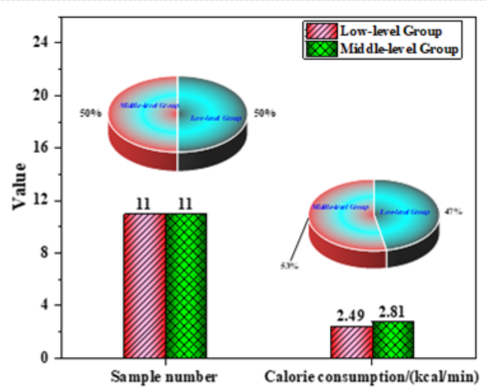
The authors of this publication declare there are no competing interests.

Figure 8. Calorie Normality for Middle-Level and Low-Level Groups

Note. (a) Test of calorie normality of middle-level and low-level students, (b) calorie normality test of middle-level and low-level students in the experimental group.



(a) Test of Calorie Normality of Students in Middle -level Group and Low-level Group



(b) Calorie normality test of students in Middle -level group and Low-level group in experimental group

DATA AVAILABILITY STATEMENT

The data used to support the findings of this study are available from the corresponding author upon request.

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