Research Article

Investigation and Analysis of the Status Quo of Sports Dance Based on Mobile Communication

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Dance sports is an emerging sport that can not only exercise the body but also please the mind and body. Under the theoretical guidance of “lifelong sports” and “health first,” in recent years, sports dance courses have not only been introduced in ordinary colleges and universities in China, but the overall quality development of students has been greatly improved, and the call for quality education for the whole people has also been answered. In recent years, the rapid development of mobile communication systems around the world has greatly enhanced the communication services of developed and developing countries to various places. This paper studies the current situation of sports dance based on mobile communication and links the century-old sports dance project with modern mobile communication to promote Chinese sports dance education and summarize more practical experience and methods with reference value. This paper introduces the development of mobile communication technology in detail, focusing on improving the user experience and service quality of sports dance, and introducing the mobile communication network into the geographic grid to solve the problem of the association between the data attributes of the base station and the geographic space. In addition, this paper systematically investigates the current situation of sports dance in A district and designs a targeted questionnaire. On the basis of the analysis of the current situation, corresponding countermeasures and measures are put forward, aiming to provide reference for the development of sports dance and make a modest contribution to promoting the widespread development of national fitness movements and promoting social harmony and civilization progress in the region. The results of the survey show that the residents’ sports dance programs have obvious age characteristics, and 77% of the students are 10-20 years old and over 50 years old. In the investigation of the main restrictive factors of sports dance development, sports dance coaches and students both put the restrictive factor of the teaching staff in the first place.

1. Introduction

Sports dance is a form of folk dance that originated in Europe and the United States and has a history of hundreds of years. Sports dance is inherited from European and American traditional court dance and ballroom dance. It is also known as “international standard ballroom dance,” and men and women participate together. In the 1930s, sports dance was introduced to China. After years of development, sports dance has become a new star with unique national charm and feeling. In the southern region, physical dance courses are basically popularized in ordinary colleges and universities, and there are many regional studies of sports dance courses. In the northern region, sports dance courses have not yet been popularized in ordinary colleges and universities, and there are very few studies on the regional conduct of sports dance courses. In recent years, sports dance has been widely developed in China, showing its unique charm. The development from sports competition to sports art reflects the further strengthening of people’s understanding of sports and is also the result of the need for an aesthetic value required by the development of society at that time.

Through the research on the current situation of sports dance, it can provide practical knowledge and technology
with reference value for the development of sports dance education in China, provide theoretical and scientific basis for the physical and mental health of Chinese people in sports dance activities, and draw appropriate conclusions. This provides an appropriate theoretical basis for the better development of Chinese sports dance, then analyzes the development strategy of Chinese sports dance education, promotes the concept of high-level development of Chinese sports dance, and summarizes higher-level theories, laying the foundation for scientific design.

This paper has consulted most of the relevant materials through the Internet and libraries, summarized the existing research results, and sorted out the relevant theoretical framework. It provides a good theoretical reserve for the smooth development of this research. To make sports dance go to the society, it is better to rely on social forces to establish a sports market. Through the combination of mobile communication technology and sports dance projects, the platform is designed according to the system target requirements, and the corresponding organization and management institutions are established to comprehensively improve the overall quality of residents.

2. Related Work

Immunity and health are closely related. When the body’s immunity is strong, it is healthy; otherwise, various diseases will be seen. Sports dance is a leisure fitness exercise that integrates sports, music, beauty, and dance. It takes body movement dance as a compulsory subject and pair or group gymnastics as the main category of sports. Studies have shown that long-term adherence to Taijiquan exercise can significantly improve serum immunoglobulin IgA, IgG, and IgM levels. A. Wang and C. Wang discussed the effect of physical dance exercise on serum immunoglobulin and T lymphocyte subsets in college students. They randomly selected 16 male and female students from the first physical dance class of the public physical education class as the experimental group. They performed bodybuilding exercises 3 times a week, 40 minutes each time, and the training intensity was controlled at a heart rate of 135-150 bpm, 10 weeks in total. In addition, 16 first-grade boys and girls were selected as the control group who did not take physical exercise. All experimental subjects were fasting, and venous blood was drawn from the elbows before and after exercise, but it was not practical [1]. AR (Augmented Reality) is an emerging technology that combines computer and simulation technology. AR (Augmented Reality) uses a computer to create a symbolic environment that immerses the user in the environment. AR can simulate the environment of real objects and show user features such as multidimensional, interactive, and immersive, to achieve an immersive effect. For sports dance, the use of AR technology can also improve the teaching effect. Aiming at the latency and energy consumption of end-to-end devices due to high-speed data transmission and high-tech computing, Xu and Chu proposed a motion dance transmission scheme using the same power allocation on the uplink. First, based on the synergy of the AR sports dance industry, a system model of AR features is established. Second, they conducted a detailed inspection of the structure of the system frame and established a barrier setup to reduce the overall energy consumption of the system. They established a mathematical model of mobile edge computing (MEC), but the application development cost is not low [2]. With the development of modern information technology, the application scope of virtual computer technology is gradually expanding. At present, virtual reality technology has been vigorously promoted and applied in sports training. Virtual reality technology is a comprehensive technology that uses computer, software, and hardware resources to create and experience virtual worlds and generate dynamic simulations of real life. In recent years, it has been widely used in the field of competitive sports, such as diving, gymnastics, trampoline, weight gain, basketball, skiing, and golf. Yuanxiang et al. analyzed the relevant content of sports dance teaching based on his understanding of virtual technology but did not get a clear conclusion [3]. Virtual reality technology can provide teaching teachers and dancers with advanced and scientific training methods and expand the scope of teaching. At the same time, sports dance simulation can promote the development of computer technology. Wang et al. mainly used virtual simulation technology to study sports dance prediction and learned a virtual simulation system for sports dance prediction and practice. The system can provide technical parameters such as team formation configuration, mechanical rationality of movements, and dance coordination for sports dancers and can be used as a powerful assistant for sports dancers. However, it is difficult to achieve all aspects at present [4]. Qi discussed the model of sports choreography assisted by a virtual environment. According to the literature review, the characteristics of dance education can be summarized into the following three aspects. (1) The first type of students has almost no dance foundation, their own conditions are relatively weak, and dance knowledge is relatively lacking. For these students, dance teachers should focus on training them in basic skills and nurturing dance culture, guide and encourage them in the teaching process, and always pay attention to their psychological development. (2) The second type of students has a certain foundation in dance, but they only focus on imitation, without their own style and lack of creativity. For these students, dance teachers should cultivate their creative thinking. (3) The third type of students has a solid foundation in dance and has a certain ability to create dance, but their thoughts fluctuate greatly and are easily disturbed by adverse factors. Therefore, they should be guided in combination with virtual teaching methods. The proposal of this method will promote the development of sports dance instruction model, but it has not been widely used [5]. Lyu and Tang proposed a physical dance teaching model based on a virtual environment. Dance music is an important means to shape the image of dance art, and it is also an important part of prompting thoughts. Dance is the art of space and time, and music creates auditory images through sound. Dance is a form of the body as a visual image. The combination of the two forms is a dance art form that combines time and space. Music in dance not only gives length to dance
but also makes dance vocabulary accurate, concise, and focused. At the same time, the language and emotional development of dance movements are also reflected in the rhythm. Exploring device development, technical issues, and research trends will have a major impact on the exploration of future images. In the field of education, virtual reality technology clearly presents a three-dimensional space scene, which enables learners to directly interact with various objects in the virtual environment and participate in the change and development of events through various forms [6]. Yoo compares the effects of sports, dance, and yoga programs on body composition, physical fitness, blood lipids, and liver function indicators in the elderly. Method: the subjects of the experiment were divided into sports dance group (n = 12, 6 males, age 70.83 ± 5.23 and 6 females, age 68.00 ± 3.03) and yoga group (n = 12, 6 males, age 68.33 ± 1.63 and 6 females, age 67.33 ± 2.50). Both groups of exercise programs were performed every 60 minutes (warm-up: 10 minutes, main exercise: 40 minutes, and cool-down: 10 minutes) twice a week for 15 weeks. Results: body composition, physical fitness, blood lipids, and liver function markers were found to have positive effects on all items in both groups, with no significant interaction. A 15-week sports, dance, and yoga program had positive effects on improving flexibility, blood lipids, and alanine aminotransferase. Therefore, long-term regular use of sports, dance, and yoga programs is believed to be beneficial for improving and maintaining physical and physiological variables related to the health of older adults [7]. The above studies provide a detailed analysis of the application of dance, sports, and modern technology. It is undeniable that these studies have greatly promoted the development of the corresponding fields. We can learn a lot from methodology and data analysis. However, there are relatively few studies on sports dance in the field of mobile communication, and it is necessary to fully apply these algorithms to the research in this field.

3. The Combination of Mobile Communication Technology and Sports Dance

3.1. Mobile Communication Technology. Mobile communication refers to the communication between moving objects or between moving objects and fixed objects, and at least one communication object can move. The mobile communication system is mainly composed of mobile switches, communication stations, and mobile phones, as shown in Figure 1. Modern mobile communication technology can be mainly divided into low frequency, medium frequency, high frequency, very high frequency, and ultrahigh frequency. In these frequency bands, technicians can use mobile station technology, base station technology, and mobile switching technology to connect terminal equipment in the mobile communication network to meet people’s mobile communication needs.

The development of modern mobile communication systems has gone through five generations [8]:

The first generation (1G) mobile communication system is an analog and semianalog mobile network that emerged in the 1980s and mainly provides voice and voice-related services. Currently, the 1G system has been discontinued in China.

The second generation (2G) mobile communication system is generally defined as the core of digital voice transmission technology, which cannot directly transmit information such as e-mail and software, but only has some basic call and time and date transmission functions. Currently, there are two main systems in the world, GSM and CDMA.

The third generation mobile communication system (3G), compared with 2G, 3G can not only transmit voice but also transmit data, provide wireless network applications, and realize four standards of high-speed data transmission and multimedia broadband services: CDMA2000, WCDMA, TD-SCDMA, and WiMAX [9].

The fourth generation (4G) mobile communication system combines 3G and WLAN, which can transmit high-quality images and video images, and its picture quality is comparable with that of high-definition TVs. The 4G system can achieve a download speed of 100 Mbps, which is a huge improvement compared to the download and upload speeds of 3G, and at the same time meets all the needs of users for wireless services. The current mainstream 4G standards are TD-LTE and LTE-FDD.

The fifth generation mobile communication technology (5G) is a new generation of broadband mobile communication technology with high speed, low delay, and large connection. Its peak theoretical transmission speed can reach 20 Gbps, which is 2.5 GB per second, which is more than 10 times faster than the transmission speed of 4G network.

The characteristics of mobile communication technology are as follows: (1) mobility, (2) complex radio wave propagation conditions, (3) serious noise and interference, (4) complex system and network structure, and (5) high frequency band utilization and good equipment performance are required.

The basic mobile communication station is a bridge between the mobile communication center and the mobile communication network equipment through wireless channels, allowing users to communicate with each other when they are moving [10]. A mobile communication base station consists of internal and external components. The interior is mainly composed of base station controllers, signal receivers, transmitters, and other equipment, which convert and transmit signals without emitting electromagnetic waves. The outside is mainly used for signal transmission and reception, while the antenna is a device that transmits electromagnetic waves to the outside world.

A mobile communication base station is a type of radio station, also known as a radio transceiver station (also known as a signal relay station or relay station). In a specific radio broadcasting area, through the mobile communication exchange, the radio transceiver station transmits the information to the mobile port or fixed telephone [11]. A basic mobile communication station is mainly composed of internal and external components. The interior is mainly composed of transistors, transmission equipment, and other basic station support equipment. The exterior is mainly composed of a support frame (tower), connecting cables (recorder), and antennas. The antenna produces electromagnetic energy conversion, and radio waves are emitted into space [12].
For a series of network optimization problems, such as how to effectively manage network data, how to evaluate network quality scientifically and efficiently, and how to treat network quality, it is necessary to study the network optimization technology project based on mobile communication network for quality analysis and demonstration system. Solve the existing network optimization problem, ensure the stability of the network to be built, and improve the user experience and service quality of sports dance, network activity, and quality [13]. To fully control network activities and quality status in the entire network, it is first necessary to fully control all kinds of signal data that affect network quality.

Geographical grid is that the earth’s surface is divided into surrounding polygonal planes N according to certain rules, each polygonal plane is called a grid unit (called a network element), and each grid unit has a number and number [14]. These polygonal planes are sequentially stitched together before cutting, approximating, and reproducing the surface. Of course, the simulation and regeneration of the surface error must be controlled within the scope of the network element. Its main purpose is to organically combine geospatial locations and geographic features, so that it can locate and present geographic information quickly and accurately. According to the different shapes, geographic grids can be divided into two categories: regular geographic grids and irregular geographic grids. A regular geographical grid divides the earth’s surface according to specific mathematical rules and the shapes of the network elements, and its cuts are usually regular shapes, such as squares and hexagons [15]. The network elements of irregular geographic grids generally do not have specific rules, and the division of these grids is often based on geographic features, management areas, and regional functions. Figure 2 is a comparison of regular and irregular grids.

Incorporating mobile communication networks into geographic grids, each entity has its own unique spatial and data characteristics. The spatial dimension is the data used to represent the space size and other information of the spatial entity, and the data dimension is the spatial dimension [16]. Through spatial effects, entity objects can be associated with geographic environments, and entity data attributes can be indirectly associated with geographic environments. The association gives the geographic aspect of the data [17]. In other words, it is how to link the network data generated by the base station with the geographical environment to play the role of network optimization.

The regular geographic grid proposed in this paper effectively solves the linking problem between base station data features and geographic locations. According to the concept of geographically consistent grid, the whole area is divided into several grid planes according to specific grid rules and numbered and marked [18]. The grid to which the base station belongs is determined by the longitude and latitude of the base station, and the number of the base station is based on the effect of the grid to which it belongs and the relationship between network storage data and addition. Base stations and grids are also determined in this way. The regional correlation between the cell signal and the grid is established by the diagonal relationship between the base station cell signal coverage and the grid. Through this area correlation, the network quality score of the base station is allocated to each corresponding grid for analysis according to the area ratio. The following is the calculation method for incorporating specific cellular network quality data into the grid [19].

Figure 3 is a diagram of the relationship between cells and grids. Cells \( A_1 \) and \( A_2 \) cover grid \( B_1 \) at the same time. The overlapping area of \( A_1 \) and \( B_1 \) is \( S_1 \), the overlapping area of \( A_2 \) and \( B_1 \) is \( S_2 \), and the quality score of the indicator \( P \) of cell \( A_1 \) is \( P_1 \). The quality score of the indicator \( P \) of cell \( A_2 \) is \( P_2 \); then, the quality score \( Q \) of the indicator \( P \) of grid \( B_1 \) is as follows:

\[
Q = \frac{P_1 \ast s_1 + P_2 \ast s_2}{s_1 + s_2}.
\]  

Assuming that a certain cell \( B_m \) is covered by \( N \) cells, the calculation formula of the score \( Q_m \) is as follows:

\[
Q_m = \frac{\sum_{n=1}^{N} P_n \ast s_n}{\sum_{n=1}^{N} s_n}.
\]  

Studying the degree distribution of network nodes is the basis for studying network robustness, and different degree distributions of network nodes will lead to different network dynamics [20]. The node degree distribution of the network corresponding to various network models will be introduced in detail below, and the mathematical expression of the
higher-order moment of the corresponding degree will be given.

3.1.1. Regular Network Degree Characteristics. For a regular network, it is assumed that the network has $n$ nodes, and each network node has $c$ neighbors. That is, the degree of any node in the network is $c$; then, for such a regular network, the probability density function of the degree distribution of the network nodes can be expressed as the following formula:

$$ P(k) = \frac{c(k)}{c} \equiv 1. \quad (3) $$

If the symbol $\langle k \rangle$ represents the average degree of a network, clearly, for such a regular network, the average degree $\langle k \rangle = c$ of its nodes.

3.1.2. Random Network Degree Characteristics. For a random network, assuming that the network has $n$ nodes, and the link probability between any two nodes is $p$, we first explore the probability of generating a network with $n$ nodes and $m$ edges [21]. Since $n$ nodes will generate at most $n(n-1)/2$ edges, to generate $m$ edges is to sample from $n(n-1)/2$ edges. Extracting $m$ edges, the probability of extracting each edge is $p$, so the probability of generating a network with $n$ nodes and $m$ edges obeys the binomial distribution shown by the following formula:

$$ P(m) = \binom{n(n-1)/2}{m} p^m (1-p)^{n(n-1)/2-m}. \quad (4) $$

So the expected value $\langle m \rangle$ of $m$ is as follows:

$$ \langle m \rangle = \sum_{m=0}^{n(n-1)/2} mP(m) $$

$$ = \sum_{m=0}^{n(n-1)/2} m \cdot \binom{n(n-1)/2}{m} p^m (1-p)^{n(n-1)/2-m} \quad (5) $$

$$ = p \cdot \frac{n(n-1)}{2}. $$

Therefore, the average degree $\langle k \rangle$ of the random network is calculated as follows:

$$ \langle k \rangle = \frac{2\langle m \rangle}{n} = \frac{2p \cdot n(n-1)/2}{n} = p \cdot (n-1). \quad (6) $$

The degree distribution of a random network is calculated as follows:

$$ P(k) = \binom{n}{k} p^k (1-p)^{n-k} = \binom{n}{k} \cdot \binom{\langle k \rangle}{k} \cdot e^{-\langle k \rangle} \approx e^{\langle k \rangle} \cdot \langle k \rangle^k k! \cdot (7) $$

The above formula is a Poisson distribution formula, so the degree distribution of the nodes of the random network obeys the Poisson distribution, and its Poisson index is the network average degree of the random network.
3.1.3. Scale-Free Network Degree Characteristics. Assuming that network \( B(n, m) \) is a scale-free network, the degree distribution of its nodes obeys a power-law function as shown in the following formula:

\[
P(k) = d \cdot k^{-\lambda},
\]

where \( \lambda \) is a power-law exponent and \( d \) is a constant. Scientists have found through a lot of statistics that the degree distribution of nodes in many networks in the real world exhibits the power-law distribution characteristic shown above, and the parameter \( \lambda \) usually has a certain range, that is, \( \lambda \in (2, 3) \). To analyze the higher-order moments of the nodes of a scale-free network, the size of the constant \( d \) needs to be obtained first. Considering that for a power-law function, its cumulative probability density function is \( 1 \) for all \( k \) values, that is,

\[
\sum_{k=0}^{n} P(k) = 1.
\]

In view of the fact that usually when discussing scale-free networks, nodes with node degree 0, that is, \( P(k = 0) = 0 \), are not considered. Second, when generating a scale-free network, the minimum bound \( a \) of the degree, which is \( k \in [a, n] \), is usually defined. Therefore, formula (9) can be written as follows:

\[
\sum_{k=a}^{n} P(k) = 1.
\]

Substituting formula (8) into formula (10), we can get

\[
\sum_{k=a}^{n} P(k) = d \cdot \sum_{k=a}^{n} k^{-\lambda} = 1,
\]

\[
d = \frac{1}{\sum_{k=a}^{n} k^{-\lambda}}.
\]

In the real communication network, the node scale is very large, that is, the value of \( n \) is very large. Therefore, the limit of the above formula can be obtained to obtain the following formula:

\[
d = \lim_{n \to \infty} \frac{1}{\sum_{k=a}^{n} k^{-\lambda}} \int_{a}^{\infty} k^{-\lambda} dk = \frac{1}{1 - \lambda} \left[ k^{1-\lambda} \right]_{a}^{\infty} = \frac{a^{1-\lambda}}{\lambda - 1}.
\]

Substituting formula (12) into formula (8) has

\[
P(k) = \frac{a}{\lambda - 1} \cdot (ak)^{-\lambda}.
\]

Next, the higher-order moments of the degree of the scale-free network whose probability density distribution is as above will be calculated. The \( T \) moment of the degree of the network is defined as follows:

\[
\langle k^T \rangle = \sum_{k=0}^{n} k^T \cdot \frac{a}{\lambda - 1} \cdot (ak)^{-\lambda} = \int_{a}^{\infty} k^T \cdot \frac{a}{\lambda - 1} \cdot (ak)^{-\lambda} dk,
\]

\[
\langle k^T \rangle = \frac{a^{1-\lambda}}{(\lambda-1)(T-\lambda+1)} \left[ k^{T-\lambda+1} \right]_{a}^{\infty}
\]

\[
= \frac{a^{1-\lambda}}{(\lambda-1)(T-\lambda+1)} \left( c^{T-\lambda+1} - a^{T-\lambda+1} \right).
\]

Usually the largest block of the network is marked as LCC. For a network \( G \), if it has \( N \) nodes, the number of nodes belongs to \( p \cdot N \) when the nodes in the ratio of \( 1 - p \) are deleted. In other words, the probability of existence of each node is \( p \). If a node \( i \) is to belong to the LCC, firstly, it must not be deleted, and secondly, its neighbor nodes also belong to the LCC; otherwise, it is impossible for the node \( i \) to belong to the largest block. Assuming that the symbol \( r \) is that node \( i \) is not linked to the largest block LCC by one of its neighbors, we again assume that the node \( i \) we are concerned about has \( k \) neighbor nodes, that is, its degree is \( k \); then, the calculation formula of the probability that node \( i \) does not belong to LCC is as follows:

\[
P(i \notin \text{LCC}) = P(k) \cdot r^k.
\]

Therefore, the average probability that node \( i \) does not belong to the LCC is the result of the above formula summing \( k \), namely,

\[
P(i \notin \text{LCC}) = \sum_{k=0}^{\infty} P(k) \cdot r^k.
\]

If node \( i \) is not linked to the largest block LCC by one of its neighbors, there are only two possibilities. The first is that its neighbor is deleted. The probability of this event is \( 1 - p \). The second possibility is that its neighbors do not belong to the LCC. Assuming that the neighbor node itself has \( k \) neighbors, the probability of this event occurring is \( p \cdot f^k \). So for node \( i \) not linked to the largest block LCC by one of its neighbors \( j \) and \( j \) has \( k \) neighbors is the case where node \( i \) is equivalent to having degree \( k + 1 \). In other words, node \( i \) has the probability of extroversion degree \( k \), which is \( (k + 1)P(k + 1) \). Therefore, it can be calculated that \( r \) satisfies the following relationship:

\[
f = \sum_{k=0}^{\infty} (k + 1)P(k + 1) \left( 1 - p + p \cdot r^k \right).
\]

To sum up, when the \( 1 - p \) proportion of nodes in network B lose their functions due to failure and no longer work, the proportion of the remaining nodes in the network remaining in the LCC occupying the original network nodes is as follows:

\[
P^{\text{LCC}} = p(1 - P(i \notin \text{LCC})).
\]
3.2. Sports Dance. Sports dance is formerly known as International standard ballroom dance, also known as ballroom dance. Sports dance includes modern dance and Latin dance. Modern dances include waltz, tango, Viennese, waltz, trot, and foxtrot. Latin dance also consists of a variety of dances, including rumba, cha-cha, samba, cowboy, and bullfight [22]. Dance sport is an elegant sport in civil society, an effective way to stimulate people’s inner emotions through rhythmic physical activity full of energy and rhythm. It is an excellent sports project integrating fitness, competition, leisure, and entertainment and has aesthetic and cultural value. At the same time, it is also a sports art that integrates leisure and entertainment, fitness and health care, and social networking.

3.2.1. The Function of Sports Dance. With the rise of national fitness, sports dance is becoming increasingly popular. With the goal of lifelong learning, a fitness-focused exercise model is rapidly spreading.

(1) From the perspective of building spiritual civilization in street squares and cultural art galleries, sports and dance activity centers seem to have been organized by vibrant community residents. It not only brought the form of national fitness but also played a leading role in cultivating lifelong sports awareness and building a socialist spiritual civilization [23]. Sports dance activity is a form of community spiritual civilization construction. It can bring happiness to people and is a high-level spiritual entertainment

(2) From the perspective of fitness, moderate participation in sports dance can improve blood circulation, promote cardiovascular activity, help improve immunity, and prevent arteriosclerosis. It can be seen that sports dance has a good effect on fitness. Sports dance is very suitable for middle-aged and elderly people to exercise and relax, and it can increase the oxygen consumption of the body, improve the blood circulation, and is conducive to the maintenance of cardiovascular health and physical function

(3) Sports dance has the function of soothing the mind of the participants. Regular participation in sports and dance activities can improve the pleasure of participants, can help to form good self-values, can temper the will and cultivate quality, and improve the ability of interpersonal communication and social activities [24].

Sports dance can meet the aesthetic needs of the subject and is in the main position in the aesthetic relationship. The aesthetic value of physical dance has an impact on individuals and society, which is expressed through performance, competition, physical exercise, and communication in pairs or groups, thus promoting the harmonious development of individuals and society.

3.2.2. Classification of Sports Dance. There are many classifications of sports and dance. From the perspective of emphasizing the effect of physical exercise, sports dance is divided into two categories, namely, mass sports dance and competitive sports dance. Popular sports dance is also known as “ballroom dance,” including slow three, slow four, flat four, and jitba. The movements are simple, the forms are eclectic, and there is no limit to the number of participants. It can be performed by one person, two people, or in groups. Popular sports dance has strong popularity and fashion and can keep up with fashion and quickly reflect the renewal and variation of the general public’s mental outlook. Competitive sports dance includes two series of Latin dance and modern dance with a total of ten items [25]. Generally speaking, competitive sports dance and movements have stricter technical requirements than ordinary sports dance and are not as popular as sports dance. The competition is divided into two types: team competition and individual competition. The competition evaluates the performance of athletes in terms of music, rhythm coordination, basic body posture, dance movement, mastery of melody, understanding of music, and dance steps. Sports dance is a narrow sense of competitive sports dance, there are two kinds of sports dance in a broad sense, one is competitive sports dance, and the other is dance for fitness and bodybuilding.

If sports want to go to society, it must adapt to the needs of the market economy and build a sports market relying on social forces. Sports dance has developed greatly in Asia in recent decades and is deeply loved by Asian people. At present, sports dance develops in two directions, one is the professional line, and the other is the mass line. Sports dance is not only competitive, but also has a certain popularity. It is a fitness and entertainment method suitable for all ages. Because of this, sports dance has been very popular with the public since its inception and quickly swept the world. The broad mass base of sports dance has laid a solid foundation for the professional development of the project. We should seize this opportunity, adapt to the market demand, build a group of professional talents, and form a virtuous cycle system in which specialization guides popularization and popularization promotes specialization. With the continuous improvement of the status of community sports among the masses, government departments at all levels should seize this opportunity and make full use of financial resources and human resources. In accordance with the law of market economy, the introduction of sports consumption services in the community takes lifelong sports as the main line, and the starting point is to benefit community residents for life. Through reasonable personal health investment, the enthusiasm of residents is mobilized, and sports and dance clubs are organized and planned and at the same time drive other residents in this big atmosphere. The establishment of sports dance clubs will definitely play a positive role in promoting the development of sports dance. Figure 4 shows a schematic diagram of the system target requirements of a sports dance project based on mobile communication.

This system adopts the common three-level structure design, namely, hardware platform, software platform, and application platform. Among them, the hardware platform mainly refers to the hardware system that carries the client and the server, and the software platform mainly refers to
the operating system, service, database, etc., on the hardware system; the application platform is the client system program itself. The system mainly consists of two main functional units, the application terminal and the data server. To ensure system security, all components of the system are deployed inside the company’s firewall and do not provide external access interfaces. The application client and the database server are connected through the network management network. The physical connection of the system is shown in Figure 5.

The degree and quality of sports dance activities depend to a large extent on the quality of teaching. To improve the quality of teaching, it is necessary not only to improve the professional quality of community instructors but also to enrich their teaching methods to flexibly use a variety of teaching methods to achieve the goal of high-quality, high-level, and high-acceptance sports dance teaching. It is necessary to flexibly use a variety of explanation and demonstration methods to teach sports dance knowledge and basic skills to residents. It is necessary to know how to tap and develop the dance potential of the community audience through the rational use of teaching skills, so that the teaching effect can be multiplied with half the effort. Teaching instructors should know how to sum up the experience, explore methods, and accumulate results to continuously optimize teaching methods, improve teaching quality, and try their best to promote sports and dance activities into the hearts of the people. With the extensive use of modern technical means, sports dance activities must also meet the needs of the trend of the times and make full use of advanced technologies such as multimedia, network, light, electricity, sound, and image to make teaching work more vivid and free, and the teaching forms are diversified. It can also make the learning of corresponding technical actions easier to understand and more intuitive and achieve the multiplier effect with half the effort. Figure 6 is a schematic diagram of a sports dance management network platform.

Leaders at all levels and government departments should pay more attention to the emerging activity of sports dance and establish corresponding organizational management institutions. In the specific operation and implementation, the community competent department and the subdistrict office take the lead, take the community sports community committee as the core, and take the sports management station, enterprise sports association, and public institutions as the basis. With sports communities and sports volunteers as the backbone, with the majority of community residents as the main body, relying on various community sports venues, establish community groups and management networks and improve the comprehensive quality and cultural quality of community residents.

4. Experiment Design of the Current Situation Investigation of Sports Dance Based on Mobile Communication

Dance sports, a program that combines sports and art, is very popular. With the development of human society, human’s understanding of health and beauty has been further strengthened, the quality of human life has been greatly improved, and the rational spiritual pursuit has also been improved to a certain extent.
4.1. Objects. To understand the current state of dance sports, this study investigated the current state of dance sports in district A. Twenty sports dance coaches and 300 students were randomly selected as research objects for research. The details of the survey respondents are shown in Table 1.

4.2. Methods. The research methods used in the research process of the dissertation include literature data method, questionnaire survey method, mathematical statistics method, and logical analysis method.

4.2.1. Documentary Data Method. To facilitate research progress, relevant literature was specifically researched through local library database resources, and references were made to books, newspapers, and magazines related to dance sports. The analysis of the collected literature and books provides a solid theoretical basis for the design and creation of this project.

4.2.2. Questionnaire Survey Method. A total of 320 questionnaires were distributed in this survey, 320 were returned, and the pass rate was 100%. There were 300 valid questionnaires, and the effective rate was 100%.

The reliability test of this questionnaire adopts the backtest method, that is, within two to four weeks after the first survey of the first questionnaire, the people in the test population in the area A are selected again from the recovery questionnaire to carry out the second retest work. The retest results showed that the content conformity of the two test results reached an average of 92%, indicating that the design of this questionnaire is reliable.

4.2.3. Mathematical Statistics Method. SPSS11.0, Excel, and other software were used for statistical analysis of the survey data.

4.2.4. Logical Analysis Method. This paper uses logical methods such as induction, deduction, and comparison to analyze and straighten out the collected literature and questionnaires.

5. Survey Results of the Current Situation of Dance Sports Based on Mobile Communication

Dance art education plays an important role in the wider development of quality education. The spiritual carrier is the eternal pursuit of human beings, which includes communicating with the human body and soul, inspiring emotions, and enhancing the fusion of wisdom and truth. Dancing with people can bring the body and mind into perfection, forcing people to strive for innovation. It can not only stimulate people’s interest in dance art but also encourage them to devote their wide range of interests and hobbies to other artistic fields, thereby encouraging their healthy development and the formation of good personality and psychological qualities. At the same time, dance can also enhance the national consciousness, observation, function, imagination, and creativity. This is why dance sports arts education events are organized in most communities to increase their motivation to learn. Through the statistics and analysis of the questionnaires, we can understand their motivation for learning sports dance and find the characteristics that affect the learning of sports dance, as shown in Table 2.

In the survey, it was found that the age span of the respondents was large, as shown in Figure 7.

It can be seen from Figure 7 that among the surveyed subjects, there are more people in the age group of 10-20 and over 50 years old, especially women over 50 years old, as high as 89. However, the data shows that the reasons why students learn sports, dance, and their education have little effect.

There are 220 students in school among the surveyed objects. For this reason, statistics about the opening of sports and dance courses in schools are made, as shown in Table 3.

Table 4 is the ranking comparison of the main constraints on the development of sports dance by expert judges, sports dance coaches, and students. Through the comparative analysis in Table 4, it can be seen that sports dance coaches and students are inconsistent in the ranking of constraints. From the perspective of sports dance coaches, it is the teaching staff, followed by the funding. From the perspective of students, the teaching staff is also put first, which is enough to show that students have higher requirements for teachers’ teaching level and technical ability and report higher expectations. At the same time, they ranked the movements as too difficult and the class hours as the 2nd and 3rd, but the sports dance coaches ranked at the bottom, indicating that the students still have great difficulties in the learning process and lack of communication with the coaches.
Among the survey respondents, there are 20 coaches about sports and dance, and their technical level and learning experience are shown in Figure 8. The evaluation of the technical level consists of two parts: expert evaluation and self-evaluation.

Course content is an important factor in setting courses, and the reasons why students choose courses are generally directly related to course content. The research for this project wanted to see if the main content of the dance physical education curriculum was attractive to students. Second, the main intention of the coach to arrange the course content can also be examined, as shown in Figure 9.

As can be seen from Figure 9, in the research on sports dance coaches, more than 50% of the people believe that the most important thing in sports dance teaching is to learn and understand music. That is, the musical understanding that student develops in sports dance teaching is the most important. The second is to learn basic materials. The application of the basic movements of sports dance is the second in the study, and the third is the application of the whole movement. Three people think it is essential.

Figure 10 is the exercise frequency and period of the trainees. It can be seen from Figure 10 that the time for the respondents to perform sports dance fitness activities is basically fixed in the morning and evening, and the proportion of fitness dances during holidays is the highest, especially for women, reaching 55, while very few people

![Figure 6: Schematic diagram of sports dance management network platform.](image)

<table>
<thead>
<tr>
<th>Table 1: Details of respondents.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sports dance instructor</td>
</tr>
<tr>
<td>Number of people</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Females</td>
</tr>
</tbody>
</table>
choose to exercise at noon. Generally speaking, residents prefer to keep the traditional morning exercise, followed by afternoon or holiday time periods. The main reason is that there is less time to exercise in the working environment, and it can only choose the afternoon or holidays. At the same time, this is also the reason residents often exercise once or twice a week, and the number of people is as high as 34%. 18% of residents use it 3-4 times a week, while only 12% of men do physical dance exercise every day. It can be seen that most residents do not think that fitness is a necessity of life.

Sports dance has a long history and a wide variety of dances, with the characteristics of rhythm, entertainment,

| Table 2: Motivation of respondents to learn sports dance. |
|---------------------------------|---------|---------|--------|
| Motivation                      | Frequency | Percentage | Ranking |
| Shaping body shape and cultivating temperament | 132 | 44% | 1 |
| Improve communication skills    | 40 | 13% | 3 |
| Interests                       | 30 | 10% | 4 |
| Strengthening the body          | 90 | 30% | 2 |
| Family’s wishes                 | 8 | 3% | 5 |

| Table 3: The opening of sports dance courses in schools. |
|---------------------------------|--------|--------|---------|
| Survey of physical dance courses | Yes | No | Professionalism |
| Equipped with special teaching materials for physical dance | 0 | 100% | 55% |
| Covering all dance genres       | 40% | 60% | 40% |
| Opened a physical dance training teaching | 50% | 50% | 55% |
Table 4: Ranking comparison between sports dance coaches and students on the main restrictive factors of sports dance development.

<table>
<thead>
<tr>
<th></th>
<th>Lack of funding</th>
<th>Faculty</th>
<th>Textbook</th>
<th>Facilities</th>
<th>Movement is too difficult</th>
<th>Too little class time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expert judges</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>6</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Coaches</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Trainees</td>
<td>6</td>
<td>1</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Figure 8: Learning of sports dance coaches.

Figure 9: Ranking statistics of sports dance teaching contents.
performance, fitness, and so on. It can transform the human body, refresh the mind, improve social skills, and more. In view of the current situation and future development needs of Chinese sports dance, the following suggestions are put forward to improve the popularity of sports dance, make residents' awareness of participation sensitive, and increase activities. It takes sports and dance activities as the carrier, takes the construction of socialist civilization as the guide, and enhances the spiritual awareness of residents in an inclusive way. Administrative and community departments at all levels should include the construction of sports dance venues and hardware facilities in the agenda and scope of daily performance assessment, give due attention to policies and systems, and give strong support to ensure that customer needs are met, providing relevant materials and institutional guarantees for community residents to participate in sports dance activities. In the current situation of the construction and development of the sports dance profession in China, it is necessary to increase the reform and development, to be in line with international standards, and according to the continuous development of sports art, the existing form training courses have not been able to meet the needs of society for sports dance talent, so it is necessary to carry out teaching reform.

6. Conclusion

Healthy life and harmony are people's pursuit of immortality and an important symbol of social progress and civilization. In recent years, dance sports, an emerging sport, has become very popular. Taking lifelong sports as its purpose, the healthy and leisure sports model is being rapidly promoted. Accelerating the pace of training, sports dance professionals actively create favorable conditions, customize professional technical training for community sports dance instructors, and improve professional quality and professional skills. In this way, we can enrich the team of teachers of the sports dance community and improve the overall technical level of sports dance community activities. The content and form of community sports dance should be expanded and combined to achieve diverse forms, simple content, easy adoption, best practice, and easy development. On this basis, according to the needs of different groups of people, appropriate technical requirements for movements can be formulated to meet the reasonable needs of different audiences for sports dance. Making sports dance gradually becomes an effective medium for communication between community residents. Dance sport is a physical activity, but if it is not done well, sports injuries are more likely to occur, for example, not warming up before exercise or warming up poorly; weak skills; poor physical fitness; inexperienced learning styles, body type, and excessive exercise; inconsistency between men and women; unreasonable choice of music rhythm; physical decline during activities; and bumping into other people during activities. Therefore, security issues cannot be ignored. With the development of human society and the further strengthening of people's awareness of health and beauty, people's quality of life has improved significantly, and their spiritual pursuit has also been enhanced to a certain extent.

Data Availability

The data underlying the results presented in the study are available within the manuscript.
Conflicts of Interest

The authors declare that they have no conflicts of interest.

References


