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Ergonomics: Designing Sports Dance Program for Teachers

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Abstract: The researcher aimed to explore the application of ergonomics in educational settings, which led to the design of a sports dance-inspired professional development program for Chinese educators. The study sought to assess teacher respondents' appreciation and participation in ergonomic activities and their impact on professional development, considering demographic variables. The researcher used a descriptive-quantitative research design and used the teachers/professors of the three (3) universities or colleges in China teaching Physical Education specifically different sports and dancing as the respondents of the study. The study highlights the need for a sports dance-inspired professional development program for Chinese educators. Such a program could enhance teacher engagement and improve the perceived impact of ergonomic initiatives on their professional development. The recommends to emphasize the importance of diversifying participant demographics in research, implementing tailored feedback mechanisms, and enhancing ergonomic training in professional development for educators. Additionally, establishing a sports dance-inspired professional development program for Chinese educators aims to improve teaching methodologies and student engagement through creative movement, promoting physical activity and overall well-being.

Keywords: Ergonomics; Sports; Dance Programs; Teachers.

1. Introduction

Ergonomics play a crucial role in the educational setting in China because of how it impacts teachers' well-being, comfort, and teaching performance. The physical environment in classrooms significantly influences how teachers perform including factors like good posture, lighting, ventilation, and flexible furniture contribute to teachers' well-being and concentration. Neglecting ergonomic standards in school design can disrupt the teacher-student connection and hinder teaching-learning performance. A well-designed workplace environment not only motivates teachers but also ensures the school's organizational health. Educating teachers about ergonomic basics can help identify and address factors contributing to musculoskeletal disorders and workplace stressors. Integrating ergonomic principles into educational settings is essential for creating conducive workplace environments that support teachers' well-being, comfort, and teaching performance supported by sports dance-inspired professional development programs.

Chinese teachers' perceptions about ergonomics are shaped by cultural norms, educational practices emphasizing uniformity, challenges in integrating modern teaching methods, and the importance of promoting digital citizenship. Job exhaustion is a prevalent issue among Chinese teachers (Zang, et. al., 2022 wherein understanding the dynamics of job load, stress, and exhaustion is crucial for addressing issues related to teacher well-being, job satisfaction, and overall educational quality. Hence, educational institutions should recognize the factors influencing job exhaustion and the mechanisms at play so that interventions like sports dance-inspired professional development program can be developed to support teachers in managing their workload effectively and enhancing their job satisfaction in a healthy workplace environment.

In the Chinese educational setting, fostering an organizational culture that values work-life balance is crucial and involves encouraging teachers to maintain a healthy balance between work and personal life lead to higher job satisfaction and productivity (Zhenjing, et. al., 2022). Hence, the present study suggests that ergonomics consideration can support work-life balance among teachers supported by professional development programs that comprises well-being initiatives. Establishing positive organizational culture towards uplifting healthy workplace environment can influence ergonomics appreciation creating a conducive workplace atmosphere that fosters active participation, engagement, motivation, creativity, and efficiency. However, commitment and achievement-striving ability form teachers is needed to achieved the objectives of the professional development program.

Ergonomics plays a crucial role in the occupational health and safety of teachers, impacting their well-being and work performance. The need for ergonomic considerations is due to the risks in the teaching profession which should ensure a safe and comfortable working environment for teachers. Educational institutions are responsible for providing a safe workplace by applying ergonomic principles to reduce the risk of stress. Implementing ergonomically designed workplaces, professional development programs like comprehensive training and proper ergonomics practices can help mitigate the risk of musculoskeletal disorders, relieve stress and other health concerns among teachers. Ergo, the present study focuses on addressing ergonomic considerations in education to provide teachers with healthy workplace environments which is relevant for promoting the health and safety including reducing musculoskeletal pain and enhancing the quality of education delivery as well as the personal needs. Implementing ergonomic principles through sports dance inspired professional development program and creating ergonomically designed workspaces can significantly benefit teachers' well-being and overall work performance.

As Bligard and Berlin (2019) introduces the use of

framework as a valuable tool for designing ergonomic workplaces to ensure that workplace systems are optimized for performance. The framework should facilitate collaboration among stakeholders including teachers to create workplace environments that align with teachers' needs and activities. It stresses the importance of considering ergonomic activities, activity-centered design, and systems theory to develop workplace environments that enhance teaching performance and well-being through a systematic approach to ergonomic workplace design

Ergonomics refers to the science of fitting jobs to people, aiming to optimize human well-being and overall system performance (Edwards, et. al., 2019). It focuses on improving the efficiency, quality, quantity, and comfort of labor while minimizing worker injury, turnover, and fatigue. Ergonomics extends beyond physical aspects to encompass psychosocial factors as well. As regards to activity indicator in implementing ergonomics, it includes regular stretching exercises, standing desks, and ergonomic furniture in the workplace aiming to reduce musculoskeletal disorders, improve posture, and enhance overall employee well-being. Implementing activity-based ergonomic interventions can significantly impact teacher productivity and comfort levels. As regards to the context indicator in which ergonomic activities are implemented plays a vital role as to effectiveness. Integrating ergonomic practices within the organizational culture, providing training on proper ergonomics, and fostering a supportive environment are key factors for successful implementation and sustainability of professional development programs. The design of ergonomic interventions encompasses a range of factors such as workstation layout, equipment adjustability, anthropometric considerations, and user feedback mechanisms. The user-centered design principles must be in place to create ergonomic solutions that are intuitive, adaptable, and supportive of diverse user needs. Establishing open communication channels between teachers, staff, administrators, ergonomics experts, and occupational health professionals is essential for fostering a culture of dialogue around ergonomics in the educational setting. Encouraging regular discussions about ergonomic issues, sharing best practices, and seeking feedback promotes awareness, collaboration, and continuous improvement in the implementation of ergonomics initiatives. Dialogue plays a critical role in addressing ergonomic concerns proactively by enabling early identification of issues, facilitating timely interventions, and promoting a culture of prevention rather than reaction. Analyzing task requirements, workload distribution, and cognitive demands is vital for designing effective ergonomic interventions. Balancing demands through appropriate ergonomic adjustments can lead to improved teacher health outcomes and healthy workplace environment.

Musculoskeletal pain and ergonomic risks are significant concerns for teachers, impacting their health, quality of life, and work performance (Kraemer, et. al., 2020). Addressing ergonomic adaptations and modifying work habits to mitigate these risks effectively is what the present study would like to point out. The ergonomic risks faced by teachers often bend down to check on students, reach over shoulder height when hanging artwork, leading to adverse postures. Sitting or standing for extended periods during class preparation, correction, computer use, and supervision duties can also pose risks. Repetitive Movements like correcting work, writing on boards, and using computers involve repetitive movements that can strain muscles as well. Improper setup of laptops, desktops, or tablets in classrooms can lead to discomfort and musculoskeletal issues. Cumulative stress from adverse postures or acute injuries can contribute to discomfort. Lifting and moving objects in the classroom pose risks of manual handling-related injuries. Moreover, strategies to reduce risks includes teachers should aim to reduce repetitive adverse postures by using stable bases when interacting with students and avoiding overreaching. Also, to minimize prolonged static postures, classrooms should be set up to allow for frequent changes between seated and standing positions. When using computers, teachers should ensure proper ergonomics with straight wrists and regular breaks to reduce repetitive movements. Teachers should be cautious of contact stress and manual handling risks by adopting safe practices in the workplace.

Ergonomic risk assessment methods in creating healthy work environments by identifying potential sources of discomfort and injury (Bazaluk, et. al., 2023; Rhen, 2023). Conducting an ergonomic assessment is to review existing data and identify common issues and high-risk departments or job types. A comprehensive ergonomic assessment is also helpful because it includes observing work conditions, interviewing workers, and analyzing data to prioritize risk factors and develop strategies for reducing those risks which should be done objectively. Effective ergonomic risk assessment requires a multi-step process that combines data collection, analysis, and strategic planning to address potential health hazards in the educational setting.

According to Dhungana, et. al. (2021), ergonomic activities enhance the active participation of teachers in professional development programs across various categories such as needs assessment, cross sectoral collaboration, teacher-student collaboration, interdisciplinary collaboration, and cross professional collaboration. Ergonomic activities can significantly impact the effectiveness of needs assessment in professional development programs through incorporating ergonomic principles into the assessment process. Teachers can better identify their individual needs and preferences so that workspace design can create a comfortable environment that fosters focus and productivity during needs assessment sessions. In the context of cross-sectoral collaboration, ergonomic activities can facilitate communication and cooperation among teachers from different sectors with the help of utilizing ergonomic tools and strategies. These can promote inclusivity and accessibility, enabling teachers to engage more effectively with colleagues from diverse backgrounds. Professional development program that is ergonomically designed can support collaborative spaces that encourages interaction and idea sharing across sectors. Ergonomic activities when integrated with sports dance inspired professional development program strengthens teacher-student collaboration as evident in the teaching methods and tools. Moreover, teachers can create a more engaging and interactive learning environment for students when feel stress free. Ergonomically designed classrooms, teaching materials and workplace in general can improve communication between teachers and students as well as other stakeholders leading to enhanced collaboration and knowledge sharing within and outside classroom. On the other hand, interdisciplinary collaboration focuses on ergonomic activities that facilitate the integration of different subject areas and teaching approaches and pedagogies within

the context of ergonomic principles. Teachers from various disciplines can work together more efficiently when optimized workspaces can promote creativity and innovation in interdisciplinary collaborations, fostering a holistic approach to education using ergonomic initiatives. Ergonomic activities are instrumental in promoting cross-professional collaboration among teachers wherein diverse expertise is also evident through adopting ergonomic practices in professional development programs. Teachers from different specialties can share knowledge and skills more effectively when the programs are ergonomically designed through training sessions and workshops. These can create a conducive environment for cross-professional collaboration that is encouraging continuous learning and growth.

The European Union (2022) explains that participatory ergonomics is a collaborative approach that involves employees, supervisors, heads and other stakeholders in identifying and eliminating workplace hazards, particularly those related to musculoskeletal disorders in which teachers are also experiencing. Empowering teachers can be supported by giving them the knowledge and influence to improve working conditions, safety, productivity, and overall well-being through ergonomics activities carefully planned using professional development programs. Teacher participation in occupational safety and health can be related to safety and health at work legal compliance. Participatory ergonomics focuses on active involvement and maximize engagement which could benefit behavior change, improved communication, enhanced company performance, and increased acceptance of workplace changes. Occupational safety and health provide the importance of consultation and meaningful teacher participation. Participatory ergonomics interventions included in professional development program involve teachers in designing solutions to reduce ergonomic risks. Participatory ergonomics is objectively leads to creating safer and healthier workplaces by involving teachers in the decision-making process regarding their work environment that fosters better communication while improving overall organizational performance.

An ergonomics program is designed to prevent work-related musculoskeletal disorders through identifying risk factors such as recognize potential hazards like lifting heavy items, bending, reaching overhead, pushing and pulling heavy loads, working in awkward body postures, and performing the same or similar tasks repeatedly. Encouraging teachers to participate in needs assessments, solution development, and implementation can create a more appreciated professional development program using sports dance inspiration. The program should ensure that teachers are trained on ergonomics and its benefits, so they can recognize and avoid hazards. From planning to evaluating effectiveness, this utilizes various approaches and techniques to measure the results and benefits of the ergonomics program, comparing pre-intervention and post-intervention data. More importantly, developing strategies to anticipate and prevent issues before they arise can also support in designing programs. Educational institutions should consider creation of a safer, healthier environment for their teachers ultimately improving productivity and reducing costs associated with it.

Sports dancing can indeed be used in ergonomic activities due to its potential benefits in improving posture, balance, and overall body movement. Participating in dance sport enhance postural stability among adults, particularly those prone to falls, which is crucial for maintaining good health and avoiding accidents as well as requires rapid movements and frequent adjustment of the center of mass helping to maintain proper posture and improves walking and standing balance (Sohn, et. al., 2018). Therefore, incorporating sports dancing into daily routines can contribute to better ergonomics and overall wellbeing and support the positive impact of dancing on balance and mobility. It also improves attention, alertness, balance, and flexibility, emphasizing that dancing is not limited to young people but also offers substantial benefits to older individuals and professionals like teachers.

The study of Chen, et. al., (2023) emphasizes the importance of focusing on various key areas to accelerate the development of Occupational Health and Safety policy in China towards enhancement of health and safety risk assessment models. Significance of improving the law on the prevention and control of occupational diseases in China is a fundamental step towards enhancing safety production in the country which suggests that establishing an independent legal system for occupational safety and health is crucial and can be achieved through a gradual improvement in Occupational Safety and Health legislation.

Generally, the elements of ergonomics programs aim to create a safer and more productive workspace through the reduction of musculoskeletal disorders and stress related concerns. The program must have clear process, teacher involvement, system linkages, duties and responsibilities, participation and commitment from the whole educational institutions. A clear process for reducing ergonomic risk in ongoing academic operations and ensuring the acceptability of new tools and equipment is vital in the process of professional development. Consistent teacher involvement in identifying both ergonomic issues and effective countermeasures as well as performing the ergonomic initiative is also relevant. Systematic linkages to continuous improvement initiatives like expert consultation and administration support will help achieve the goals of the program. Appropriate duties and responsibilities for everyone involved in the ergonomics process must be properly documented. participatory approach must be cleared out as to engaging all stakeholders, identifying hazards, preventing hazards, providing ongoing training, managing medical resources, and continually evaluating the program. These elements when used appropriately can work together to create a comprehensive ergonomics program for teachers within the context of sports dance inspired theme that addresses the specific needs of a given workplace in education.

2. Statement of the Problem

The researcher explored the application of ergonomics in educational setting which leads to designing of a sports dance-inspired professional development program for Chinese educators.

Specifically, the researcher sought to provide answers on the following;

1.What is the profile of the employee-respondents in terms of;

1.1Age;

1.2Sex; and

1.3Years in Service?

2.What is the assessment of the teacher-respondents as to their level of appreciation about the implementation of ergonomics on their workplace environment as to;

2.1Organizational Culture;

2.2Occupational Health and Safety; and
2.3Personal Health Practices?

3.Is there a significant difference in the assessment of the teacher respondents as to their level of appreciation on the implementation of ergonomics on their workplace environment when profile variables are considered?

4.What is the assessment of the teacher-respondents on the ergonomic activities implemented to improve workplace environment as regards to;
4.1Activity;
4.2Context;
4.3Demands;
4.4Design; and
4.5Dialogue?

5.Is there a significant difference on the assessment of the teacher-respondents on the ergonomic activities implemented to improve workplace environment when profile variables are used as the test factor?

6.What is the assessment of the teacher respondents on the influence of these ergonomic activities on active participation of teachers on professional development programs as to;
6.1Needs Assessment
6.2Cross Sectoral Collaboration;
6.3Teacher-Student Collaboration;
6.4Interdisciplinary Collaboration; and
6.5Cross Professional Collaboration?

7.Is there a significant difference on the assessment of the teacher respondent on the influence of these ergonomic activities on active participation of teachers on professional development programs when grouped according to their profiles?

8.Based on the results of the study, what sports dance-inspired professional development program can be designed for Chinese educators?

3. Research Design

This study employed a descriptive research approach using quantitative methodologies. When a population, situation, or phenomena is meant to be accurately and methodically documented through descriptive investigation, this research strategy is acceptable to queries about why cannot be answered, but queries about what, where, when, and how can. This type of research provides a detailed and accurate image of the characteristics and behaviors of a certain group or topic. Descriptive research enables researchers to understand a particular problem by observing and gathering data. It also offers insightful information that can guide future research. As explained by Aggarwal (2019), descriptive research is one that aims to characterize the distribution of one or more variables without taking into account any other theories or causal relationships. This method provides a rich and detailed account that aids in understanding, categorizing, and interpreting the subject matter. Descriptive research design is widely employed across diverse fields, and its primary objective is to systematically observe and document all variables and conditions influencing the phenomenon.

However, as the Question Pro (2024) explains, quantitative research designs outline the methods that will be used to collect and analyze the data, including surveys and experiments. Quantitative research is the methodical examination of phenomena by means of quantifiable data collecting and the use of computer, statistical, or mathematical approaches. Sample strategies and online surveys, polls, and questionnaires are just a few of the instruments used in quantitative research to collect statistically significant information from present and future customers.

The researcher used the Quantitative Descriptive Research to achieve the goals of this study whereas the survey questionnaire served as the primary source of data.

4. RESULTS AND DISCUSSIONS

Profile of the Respondents

Table 1. Profile of the Respondents

AGE	FREQUENCY	PERCENTAGE
22-27 Years Old	16	9.8
28-33 Years Old	13	7.9
34-39 Years Old	80	48.8
40 Years Old and Above	55	33.5
SEX	FREQUENCY	PERCENTAGE
Male	122	74.4
Female	42	25.6
Total	164	100.0
YEARS IN SERVICE	FREQUENCY	PERCENTAGE
Less than 5 Years	72	43.9
5 to 10 Years	62	37.8
11 to 15 Years	16	9.8
15 Years and Above	14	8.5
Total	164	100.0

Table 1 exhibits the profile of the respondents as to age, sex and years in service.

Data reveals that out of the 164 respondents, the majority of the respondents are 34-39 years old with a frequency of 80 or 48.8%. Hence, the age bracket with the least number of frequencies is 28-33 years old with a frequency of 13 or 7.9%

of the 164 respondents.

This means that the majority of the respondents for the sports dance program are middle-aged teachers. This is supported by (Wang et al., 2021), who investigated the impact of sports dance on physical health in the context of national fitness exercise. Their study involved enrolling 20 healthy middle-aged and elderly individuals in dance training, indicating the active participation of middle-aged individuals in dance programs. However, according to Felicia et al., (2022) the underrepresentation of young to early middle-aged adults in extracurricular activities like sports dance programs can be attributed to various factors such as career and personal life pressures. Individuals in this age group often face challenges related to forming their professional careers, pursuing further education, and managing young families, which may limit their interest in participating in such activities (Felicia et al., 2022). Thus, including dance-based activities into professional development programs for teachers may be an effective way to support their overall well-being and ergonomic considerations in the workplace.

The data denotes the active participation of middle-aged teachers in sports dance programs. To create a more inclusive and diverse participation among all age group, schools and educational institutions may consider integrating dance-based activities into their professional development programs. This approach could improve not only the physical health and well-being of teachers but also their job satisfaction and workplace ergonomics. Integrating ergonomic principles and dance-inspired activities into educational settings is essential for creating conducive workplace environments that support teachers' physical and mental health, comfort, and teaching performance.

As to sex. The data reveals that out of the 164 respondents, majority are male, with a frequency of 122 or 74.4 percent. Hence, female respondents are 25.6 percent only, with a frequency of 42.

This highlights that most of the respondents in the study are male, this may be due to societal or cultural norms that associate sports and physical activities more closely with men. This aligns with Preece & Bullingham, (2020) study, which cited that the portrayal of physical education and sports as traditionally masculine domains may contribute to the disparities in participation between male and female teachers in sports dance programs. In addition, according to Aasland & Engelsrud, (2021) this bias can be worsened by structural discrimination in physical education, which often focuses on traditional male sports and fitness practices, marginalizing female teachers. Furthermore, it could also reflect a possible imbalance in the overall gender distribution of the teaching staff at the institutions involved in the study. The lower participation rate of female teachers maybe because of barriers such as time constraints, caregiving responsibilities, or a lack of interest or encouragement to participate in sports activities. According to Ibrahim (2023) gender disparity could affect the overall dynamics and outcomes of the sports dance program, as mixed-gender interactions and diverse perspectives enrich the learning and engagement experience. Mixed-gender interactions and diverse perspectives are crucial for enriching the learning and engagement experience in sports dance. Understanding gender differences is essential not only for sports programs but also for broader discussions on gender equity in sports (Ibrahim, 2023).

This indicates a need for more inclusive strategies to encourage female participation. To address this imbalance, the program organizers may consider targeted outreach and support mechanisms to engage female teachers. This could involve flexible scheduling, creating a more supportive environment for female participation, and actively challenging any cultural or societal barriers that may discourage women from engaging in sports activities. Such initiatives would not only promote gender equality but also enhance the effectiveness and inclusivity of the program.

As to years in service. It is noted that out of the 164 respondents, the highest frequency is seen in those with less than 5 years of service, with 72 frequency or 43.9 percent. On the other hand, the lowest frequency is observed among respondents with 15 years above of service, which has only 14 frequency or 8.5 percent.

This means that most of the respondents are newer teacher or from the younger workforce, likely more adaptable and open to engaging in new physical activities such as sports dance programs. This group could benefit from programs that enhance physical fitness and social interaction, which might help to their professional development and reduce early-career stress. On the other hand, fewer participants with over 15 years of service might be due to physical limitations, being more satisfied with their jobs, or having more family commitments. This variation in years of service necessitates a program design that can accommodate the diverse needs and physical capabilities of teachers at different career stages. According to Unsal et al., (2021) workplace wellness programs play a crucial role in promoting healthy behaviors among employees. However, to maximize the benefits of such programs, it is essential to customize them to address the specific needs of employees based on their career stages and physical health status. Younger employees often seek opportunities for social and physical engagement, while older employees may prioritize activities that accommodate their physical constraints and time availability (Tringali & Aldridge, 2021).

Data affirms the need for a sports dance program that is dynamic and engaging to attract and retain the newer teachers. By incorporating ergonomic principles, a comprehensive program can be designed to promote physical health, reduce the risk of injury and productivity among teachers at all career stages.

5. Conclusion

1.The study reflects the experiences of a younger, male-dominated teaching workforce early in their careers, suggesting limited career experience across respondents.

2. Respondents slightly value ergonomic measures, but improvements are needed to enhance their impact on teachers' work experiences and perceptions

3. The uniform perception across demographics indicates that ergonomic initiatives are consistently viewed, regardless of age, sex, or years in service.

4. Ergonomic activities are perceived as having minimal impact on workplace aspects like activity, context, demand, design, and dialogue, with only slight improvements noted.

5. The limited impact of ergonomic activities is consistently perceived across demographic groups, highlighting a general consensus.

6. Ergonomic initiatives are seen as having little influence on teachers' active participation in professional development programs, suggesting a need for additional motivational strategies.

7. Demographic factors do not affect teachers' perception

of the limited impact ergonomic activities have on their professional development engagement.

8. A sports dance-inspired professional development program is necessary for Chinese educators to address specific professional needs.

6. Recommendations

1.Diversify participant demographics in future research to ensure ergonomic perceptions reflect the entire teaching workforce.

2. Implement tailored feedback mechanisms to gather detailed insights on ergonomic measures, fostering continuous improvement in educational settings.

3. Conduct a comprehensive review of ergonomic policies, involving stakeholders from diverse demographics to identify gaps and improve practices.

4. Enhance professional development programs by integrating ergonomic training, empowering teachers to optimize their workspaces and physical health.

5. Establish a task force to promote ergonomic awareness through educational campaigns, creating a supportive environment for teachers' well-being.

6. Implement regular ergonomic assessments to proactively optimize teaching environments for safety, comfort, and productivity.

7. Foster open communication between teachers, administrators, and occupational health professionals to continuously improve ergonomic practices.

8. Create a sports dance-inspired professional development program for Chinese educators to enhance teaching methods and student engagement through creative movement.

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