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Socio-Ecological Factors and Physical Literacy that Shapes the Physical Activities of Chinese Students

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Abstract: This research utilized descriptive correlational predictive research design to explore the socio-ecological factors affecting Chinese students' sports literacy and physical activity, with the objective of constructing a Physical Education Activity Plan and analyzes the ways to explore effective ways to cultivate Chinese students' sports literacy and physical activity. With 398 respondents from 4 universities, selected through stratified sampling, the researcher found out that: The level of influence of socio ecological factors on the physical activity of the students is considered to be very influential. Students who believe that socio-ecological factors have a significant impact on their physical activity are more likely to advocate for changes in their communities that make it simpler for them to be active. Those with high physical literacy are better prepared to participate in a variety of physical activities and sports. They possess the required skills and talents to participate in activities. There is a positive relationship socio-ecological factors and physical literacy of the students.

Keywords: Socio-Ecological Factors; Physical Literacy; Physical Activity.

1. Introduction

Today, the waves of economic globalization, information explosion and cultural pluralism are rising, posing great challenges to the original concept of physical education and health education models. The international community, especially developed countries, are generally facing problems in the field of health and other fields due to changes in lifestyle, such as dealing with sedentary behavior, lack of exercise, decreased sports participation, quality of physical education, national health level, medical expenditure and social governance, etc. International organizations and countries focus on developing national physical literacy in a "comprehensive" and "lifelong" manner through physical literacy-related programs and projects. International organizations and countries have focused on the development of "comprehensive" and "lifelong" national physical literacy through physical literacy-related programs and projects.

Individuals with high levels of physical literacy are more likely to be physically active, have better motor skills, and have improved physical fitness. (Wenjing Yan, Leqin Chen, Lina Wang, Yihan Meng& Ting Zhang, 2023) In addition, physical literacy has been associated with a variety of other positive outcomes, including improved cognitive development, social skills, self-esteem, and overall health. (Barbara Gilic, Pavle Malovic, Mirela Sunda, Nevenka Maras & Natasa Zenic, 2022) Our country is also facing health issues such as a decline in physical health among adolescents that has been going on for many years, an increase in the number of people with chronic diseases, and an aging population, and physical literacy is proving to be an answer to the health crises that today's human societies are finding difficult to cope with. Health crises that human society can hardly cope with today, proposing new ideas and tools to cope with them (Cao Zhen, 2022). Therefore, based on advanced international concepts and rooted in the Chinese context, exploring the socio-ecological factors, physical literacy and physical activity among Chinese students is an urgent issue for the Chinese education sector to address. In order to improve students' physical literacy and physical activity levels, some previous researchers have tried to identify and understand the causes of insufficient physical activity and low physical literacy, but they mainly focused on individual-level factors such as self-efficacy (Martins, J., Marques, A. ＆Peralta, M.,2017). However, they did not take into account that student growth is influenced by a set of interrelated socio-ecological factors from the individual, society, physical environment, and policy and advocacy, each representing a different level of influence from different environments on individual student growth and behavior. Effective monitoring and control through the synergistic operation of multiple different factor systems in the social-ecological system is the main way to implement interventions for students' physical literacy and physical activity in China. Therefore, this study attempts to explore the relationship between social-ecological factors and students' physical literacy with the aim in view of developing physical activity that is most appropriate for students in China from multiple perspectives, and further explore the key factors affecting students' physical literacy and physical activity in China. The purpose of this study is to analyze whether socio ecological factors and physical literacy factors influence Chinese students' physical activity, so as to explore the effective ways of cultivating physical literacy and physical activity, and to provide theoretical and practical bases for optimizing the paths of Chinese students physical activity development.

2. Scope and Delimitation of the Study

This paper explores the socio-ecological factors affecting Chinese students' sports literacy and physical activity, with the objective of constructing a structural equation for the socio-ecological factors affecting Chinese students' sports literacy and physical activity, and analyzes the ways to explore effective ways to cultivate Chinese students' sports literacy and physical activity.

Stratified sampling method was used to select a total of 398 respondents from 4 universities in Shang Qiu City, Henan

Province. (Shang Qiu Normal University, Shang Qiu Institute of Technology, Shang Qiu College, and Shang Qiu Vocational and Technical College).

Perceived Physical Literacy Instrument (PPLI) and the Questionnaire on Socio-Ecological Factors Influencing Physical Activity among Chinese Students will be administered.

The conclusions reported in this section are the outcome of a statistical analysis performed with jamovi 2.3.19. The research questions covered in this article are revisited. As a result, the findings are provided with their interpretations and analyses.

3. Preliminary Analysis

Reliability

Table 1. Reliability Measurement – Assessment of Socio-Ecological Factors (Cronbach's Alpha)

Construct	Cronbach's Alpha	No. of Item/s Deleted	No. of Item/s Retained
Self-efficacy	0.93	0	5
Perception of Health Benefits	0.94	0	5
Motivation and Attitudes	0.94	0	5
Social Support	0.94	0	5
Social Networks	0.94	0	5
Cultural Norms	0.91	0	5
Access to Facilities	0.92	0	5
Neighborhood services	0.94	0	5
Residential Environment	0.93	0	5
Government Policies	0.94	0	5
Advocacy Efforts	0.94	0	5

Assessment of Physical Literacy Factors

Construct	Cronbach's Alpha	No. of Item/s Deleted	No. of Item/s Retained
Knowledge and Understanding	0.92	**0**	**3**
Self-Expression and Communication with Others	0.94	**0**	**3**
Self-awareness and self-confidence	0.94	**0**	**3**

Table 1 outlines the reliability assessment, specifically focusing on measuring the Cronbach's alpha of the scales, assessment of socio-ecological factors on the physical activity (self-efficacy, perception of health benefits, motivation and attitudes, social support, social networks, cultural norms, access to facilities, neighborhood services, residential environment, government policies, and advocacy efforts) as well as the assessment of assessment of the respondents on the following physical literacy factors (knowledge and understanding, self-expression and communication with others, and self-awareness and self-confidence). Cronbach's alpha (CA) is a statistic that is employed to ascertain the internal consistency or dependability of the constructs that will be examined. The CA value, which must be equal to or greater than 0.70 (Fornell & Larcker, 1981; Nunnally, 1978), determines which items are considered excellent. The tabulated data indicates that all items are considered to be good items with high internal consistency based on the CA values ranging from CA = 0.91 to 0.94.

Table 2. Normality Test

		Shapiro-Wilk	
	N	W	p
Socio-Ecological Factors	683	0.98	0.097
Physical Literacy	683	0.91	0.085

Since both the generated p-values from the Shapiro-Wilk test are higher than 0.05, this will confirm that the data is normally distributed. Hence, to determine if there is a significant relationship between the socio-ecological factors and physical literacy of the students, a parametric test, particularly, the Pearson's r correlation will be employed.

Table 3 summarizes the correlation matrix for the relationship between the socio-ecological factors and the physical literacy of the students. The Pearson's r correlation analysis shows that all of the domains have p-values less than the set significance level of 0.05. This means that the null hypothesis is not true and there is a significant relationship between the variables. Specifically, socio-ecological factors are correlated with physical literacy, which can be manifested in the correlation coefficients between 0.61 and 0.86 (strong to very strong relationship). The correlation coefficients are positive, indicating that when the level of assessment of the socio-ecological factors (self-efficacy, perception of health benefits, motivation and attitudes, social support, social networks, cultural norms, access to facilities, neighborhood services, residential environment, government policies, and advocacy efforts) increases, so does the assessment of physical literacy (knowledge and understanding, self-expression and communication with others, and self-awareness and self-confidence), and vice versa.

Physical literacy is the ability to move confidently and effectively in a wide variety of physical activities. It is vital for maintaining a healthy and active lifestyle, encompassing a diverse array of abilities, from fundamental motor skills to more intricate movements. The development of physical literacy is influenced by a variety of factors; however, socio-ecological factors have been shown to have a positive effect on this essential skill set (Hurter et al.,2022).

Socio-ecological factors are the social and environmental factors that influence the behaviors and decisions of individuals, as defined by Ngwenya et al. (2022). These influences may encompass familial dynamics, community resources, cultural norms, and access to recreational facilities. Research has demonstrated that these components significantly influence the physical literacy levels of individuals of all ages.

Family support and encouragement are crucial socioeconomic factors that positively link with physical literacy levels. Rodríguez-Rodríguez et al. (2024) found that children who get parental support and encouragement are more likely to engage in physical activities and develop physical literacy skills. This support can take many forms, including providing opportunities for organized sports and activities, modeling active behavior, and acknowledging effort and improvement.

Table 3. Correlation Matrix between Socio-Ecological Factors and Physical Literacy

	Knowledge and Understanding	Self-Expression and Communication Skills with Others	Self-Awareness and Self Confidence	Overall
1.Self-Efficacy	0.61	0.66	0.65	0.67
	< .001	< .001	< .001	< .001
Perceptions of Health Benefits	0.71	0.72	0.74	0.76
	< .001	< .001	< .001	< .001
Motivation and Attitudes	0.70	0.75	0.76	0.77
	< .001	< .001	< .001	< .001
Social Support	0.74	0.75	0.77	0.79
	< .001	< .001	< .001	< .001
Social Networks	0.72	0.76	0.78	0.79
	< .001	< .001	< .001	< .001
Cultural Norms	0.74	0.77	0.79	0.80
	< .001	< .001	< .001	< .001
Facility Use	0.73	0.76	0.76	0.79
	< .001	< .001	< .001	< .001
Neighborhood Services	0.75	0.78	0.79	0.81
	< .001	< .001	< .001	< .001
Residential Environment	0.77	0.82	0.82	0.85
	< .001	< .001	< .001	< .001
Government Policies	0.84	0.81	0.81	0.86
	< .001	< .001	< .001	< .001
Advocacy Efforts	0.78	0.84	0.83	0.86
	< .001	< .001	< .001	< .001
Overall	0.61	0.66	0.65	0.67
	< .001	< .001	< .001	< .001

Legend: .00-0.19: Very Weak; 0.20-0.39: Weak; 0.40-0.59: Moderate; 0.60-0.79: Strong; 0.80-1.00: Very Strong.

In addition to family support, access to community resources and facilities is critical for developing physical literacy. People who have access to safe and well-maintained parks, playgrounds, and sports facilities are more likely to engage in physical activity and enhance their motor skills. Community-based initiatives and organizations that promote physical activity and skill development can also contribute to increased physical literacy (Cairney et al., 2019).

Cultural conventions and ideas can also influence physical literacy levels. Physical activity may be promoted and respected in specific cultures, resulting in higher levels of physical literacy among members of those communities. In contrast, in cultures where physical activity is not highly valued, people may be less likely to engage in physical activity and enhance their movement skills. Communities must cultivate a culture of physical activity and provide opportunities for everyone to participate in active pursuits. (Whitehead, 2019).

Finally, according to Rudd et al. (2020), the built environment can have a significant impact on physical literacy. People who live in walkable neighborhoods near parks, leisure centers, and bike lanes are more likely to engage in physical activity and enhance their mobility. Individuals who live in communities with insufficient physical activity infrastructure, on the other hand, may face difficulties in developing physical literacy.

4. Conclusion

1) The level of influence of socio ecological factors on the physical activity of the students is considered to be very influential. When students believe that these factors have a significant influence on their physical activity, it might affect their behavior in a variety of ways. Students may be more

likely to engage in physical exercise if they have convenient access to recreational facilities such as gyms, parks, or sports fields. On the other hand, if these facilities are inadequate or if social norms discourage physical activity, students may be less inclined to engage in regular exercise.

2) Students who believe that socio-ecological factors have a significant impact on their physical activity are more likely to advocate for changes in their communities that make it simpler for them to be active. They may advocate for the construction of new recreational facilities, safer streets for walking and biking, or programs to encourage physical exercise among their peers.

3) The assessment of the physical literacy factors is also very influential A high score on physical literacy aspects might also lead to better mental health. Regular physical activity has been demonstrated to alleviate symptoms of anxiety and depression, enhance mood, and boost general well-being. Individuals who are physically literate are more likely to participate in regular physical activity, which results in these mental health benefits.

4) Those with high physical literacy are better prepared to participate in a variety of physical activities and sports. They possess the required skills and talents to participate in activities such as running, swimming, dancing, and group sports. This can result in more opportunities for interaction, relationship building, and the development of teamwork and togetherness.

5) There is a positive relationship socio-ecological factors and physical literacy of the students. In the event that there is a positive correlation between socio-ecological characteristics and the physical literacy of students, this suggests that favorable socio-ecological conditions contribute to the enhancement of students' physical literacy. It is possible for students to participate in more physical activities if the setting they are in gives them support and encouragement. Enhanced physical literacy has the potential to result in improved physical health, hence lowering the risk of obesity and diseases associated with it. Creating an atmosphere that encourages kids to participate in physical activities can, in general, have a wide range of beneficial effects on the students' overall well-being and development.

5. Recommendation

Based on the conclusions, the researcher may recommend the following:

1) The school may provide students with ample opportunities to engage in physical activity by offering well-equipped gymnasiums, sports fields, and physical education classes. Additionally, schools may partner with local community organizations to provide students with access to recreational facilities such as parks and sports clubs.

2) The teachers may prioritize physical education classes and recess time to ensure that students have opportunities to be physically active throughout the day. Additionally, schools may organize extracurricular sports teams, fitness clubs, and intramural leagues to engage students in physical activity outside of regular school hours.

3) The school administrators may organize family fitness events, workshops, and informational sessions to educate parents about the importance of physical activity for their children's health. Additionally, schools may collaborate with parents to create a supportive environment at home that encourages and reinforces healthy lifestyle habits.

4) The physical education department may implement a comprehensive physical education curriculum that focuses on developing fundamental movement skills. These skills, such as running, jumping, throwing, and catching, form the foundation for more complex physical activities and sports. By teaching students these fundamental movement skills in a structured and progressive manner, educators may help them build a strong physical literacy foundation that will serve them throughout their lives.

5) The teachers may provide students with opportunities to engage in a variety of physical activities and sports. This may help them discover activities that they enjoy and excel in, leading to increased motivation and engagement in physical fitness. By offering a diverse range of activities, educators may cater to the interests and abilities of all students, creating a more inclusive and positive learning environment.

6) The teachers may integrate physical activity into the daily school routine. This may include incorporating movement breaks into classroom lessons, implementing active recess and lunchtime activities, and promoting physical activity outside of school hours. By making physical activity a regular part of students' daily lives, educators may help them develop healthy habits and improve their overall physical fitness levels.

7) The school administrators may ensure policies and regulations that support physical activity and movement, as well as providing funding and resources for programs and initiatives that promote physical literacy. By prioritizing physical literacy in policy and governance decisions, they may create a supportive environment that fosters the development of physical literacy skills in individuals of all ages.

8) The teachers may encourage positive social norms around physical activity and movement, as well as provide opportunities for social support and encouragement. For example, creating community-based programs and initiatives that promote physical activity can help to build a sense of community and belonging, which can in turn motivate individuals to engage in regular exercise.

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