



Positive youth development settings to and barriers through rock climbing in physical education

Entornos positivos para el desarrollo de los jóvenes y barreras a través de la escalada en roca en la educación física

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Abstract

Introduction: This study aims to describe the setting of contexts, types of environments, and barriers through rock climbing that promote positive youth development in Physical Education at one of the High Schools in Pandeglang Regency, Banten, Indonesia.

Objective: Based on the theoretical framework of outdoor adventure education and the positive youth development model.

Methodology: Researchers interviewed nine teachers with and without experience in rock climbing adventure education through semi-structured interviews regarding the setting of contexts and environments that promote positive youth development.

Results: The teachers conveyed the influence of considering the contexts and types of environments that promote positive youth development, such as physical, emotional, and community aspects. Potential barriers include the risk of falling or injury, the nature of rock climbing activities, infrastructure, and safety.

Discussion: The teachers stated that they can facilitate positive youth development by considering the contexts and types of environments through rock climbing adventure education.

Conclusions: The setting of contexts and types of environments for positive youth development through rock climbing adventure education has the potential to generate synergies with positive impacts.

Keywords

Positive youth development; outdoor education; rock climbing.

Resumen

Introducción: Este estudio tiene como objetivo describir el establecimiento de contextos, tipos de entornos y barreras a través de la escalada en roca que promueven el desarrollo positivo de los jóvenes en Educación Física en una de las escuelas secundarias de Pandeglang Regency, Banten, Indonesia.

Objetivo: Basado en el marco teórico de la educación de aventura al aire libre y el modelo de desarrollo positivo de jóvenes.

Metodología: Los docentes transmitieron la influencia de considerar los contextos y tipos de entornos que promueven el desarrollo positivo de los jóvenes, como los aspectos físicos, emocionales y comunitarios. Las posibles barreras incluyen el riesgo de caídas o lesiones, la naturaleza de las actividades de escalada en roca, la infraestructura y la seguridad.

Discusión: Los docentes afirmaron que pueden facilitar el desarrollo positivo de los jóvenes teniendo en cuenta los contextos y tipos de entornos a través de la educación de aventura de escalada en roca.

Conclusiones: El establecimiento de contextos y tipos de entornos para el desarrollo positivo de los jóvenes a través de la educación de aventura en escalada en roca tiene el potencial de generar sinergias con impactos positivos.

Palabras clave

Desarrollo positivo de la juventud; educación al aire libre; escalada en roca.

Introduction

Youth aged 10-24 comprise 24% of the world's population. The World Health Organization recommends that adolescents under 18 years old engage in physical activity for 60 minutes daily, yet 81% of adolescents aged 13-15 do not meet this recommendation (WHO, 2010; Bull et al., 2020). Adolescent involvement in physical activity decreases with age, with 21.4% of boys and 49.5% of girls aged 15 to 24 being less active in physical activities (Duffey et al., 2021). It is concerning because adolescents accustomed to physical activity are likely to maintain it (Telama et al., 2014). Physical and emotional skills contribute to the holistic development of individuals, equipping them with the resources to cope more effectively with today's challenges (Biddle et al., 2019). Physical activity and Physical Education have emerged as important alternatives to address these barriers (Laguna-mengibar, 2025). Outdoor learning in natural environments is an emerging approach in the education sector. Assessing the success of outdoor education programs in achieving specific learning objectives, such as interpersonal skills and student independence, is important (Hernawan et al., 2024). Outdoor education programs can develop leadership skills, improve decision-making abilities, team management, and initiative (Nariya, Sangtani, Shah, & Patel, 2019). Other research has linked outdoor education participation to improved psychological well-being, including reduced stress levels and increased happiness (Zhou & Lau, 2022).

Outdoor education, including sports like rock climbing, abseiling, rafting, and caving (Bowen et al., 2016), can provide opportunities to increase adolescent sports participation (Duffey et al., 2021). Rock climbing positively influences physical and psychological development (Sanchez et al., 2019). Fraser-Thomas et al. (2007) categorised the benefits of rock climbing for adolescents related to physical and social development. Rock climbing helps maintain a healthy lifestyle and positively affects the cardiovascular and cardiopulmonary systems, as well as the active and passive structures of the locomotor system, with psychological and sociological benefits obtained in the environment and surrounding nature (Bohne & Smith, 2007). Rock climbing emphasises various social, emotional, cognitive, and physical skills, contributing to overall development regardless of age (Bialeschki et al., 2017). Other research results show the motives for rock climbing, such as challenge, risk, performance, personal development, and enjoyment (Ewert et al., 2013). Studies in Malaysia and Indonesia indicate that the main motives for students to participate in outdoor education activities are to enjoy the outdoors, seek new experiences, face challenges, learn new skills, and socialise with the community (Samsudin et al., 2019).

Through the self-determination theory and social cognitive theory, which focus on competence, autonomy, and relatedness (Ryan & Deci, 2000), the three primary psychological needs that motivate human behaviour can explain students' motives to engage in outdoor education activities, including adventure sports like rock climbing. These theories suggest integrating adventure sports like rock climbing into physical education curricula can provide meaningful sports experiences and promote lifelong sports participation for children and adolescents (Fruhauf et al., 2023). Youth well-being encompasses physical, psychological and social aspects that are interrelated in life through social integration that demonstrates engagement and relationships with the community to foster a sense of belonging and mutual support (Martela & Sheldon, 2019; Rubin et al., 2019). Research results state that outdoor activity contributes to physical health and psychological well-being (Utepova et al., 2024). Increasing outdoor education research is very important in the world of education as a popular topic every year and the various positive benefits of outdoor education activities carried out by young people (Diaz-perez et al., 2023). However, gap of knowledge about outdoor education is the main reason why teachers do not include this type of activity in Physical Education (Barroso, 2024). This research discusses considering context settings, environmental types, and barriers based on positive youth development settings through rock climbing to promote positive youth development.

Theoretical framework

Outdoor education can be crucial in developing positive social relationships and individual interactions (Germinaro et al., 2021). Interaction with the outdoors can enhance adolescents' social relationships and increase sensitivity to social relationships (Goldy & Piff, 2020). Outdoor education has shown social-emotional benefits, including increased self-esteem, self-efficacy, and resilience (Mygind, 2019). Outdoor education activities positively influence students' personal and social well-being, cooperation, self-confidence, and problem-solving (Mirrahmi et al., 2011). Based on self-determination theory, the basic psychological needs for autonomy, competence, and social relatedness are comprehensively referred to



as the motives for participation in adventure sports in various adventure activities (Mackenzie et al., 2022). Self-determination theory explains how intrinsic motivation fosters a sense of relatedness and competence through respect, care, inclusivity, feedback, and positive choices and enhances competence related to health, social connectedness, and intrinsic motivation towards physical education through outdoor education activities (Barfield et al., 2021). These competencies align with the three factors of self-determination theory: autonomy, competence, and social relatedness, which are crucial during the adolescent developmental phase. Introducing adventure sports can be an intervention strategy to target adolescent developmental changes (Dahl et al., 2018).

The two basic psychological needs of autonomy and competence are also aligned with the outdoor education pedagogical model, which depicts personal growth enhancement through adventure experiences (Williams & Wainwright, 2016). This model consists of five main components of experiential learning outdoors, including challenges due to the development of experiences, abilities and resources to perform tasks that were initially beyond one's emotional and physical capacity, based on setting goals and making responsible decisions.

The community contributes to and connects environments to broader resources. Participation in outdoor education programs is beneficial for social-emotional learning aspects, such as self-esteem, self-confidence, mutual trust, and a sense of belonging, providing opportunities for students and teachers to learn through observation and experience in authentic situations and having a positive influence on personal, social, physical, and academic development (Becker et al., 2017).

The positive youth development model considers the context and types of environments that enable young people to develop these competencies. There are characteristics of environments that promote positive youth development, emphasizing physical (e.g., safety considerations), emotional (e.g., environments that facilitate positive and supportive relationships with peers and adults), and community-focused (e.g., outdoor education describes experiential learning in the natural environment) aspects. Targeted programs can develop positive youth development settings by creating supportive environments, such as youth sports, as a way to achieve positive youth development outcomes (Acosta et al., 2021; Larson, 2000; Waid & Urich, 2020). Adventure education, including rock climbing, can be a way to achieve positive youth development, as the natural alignment between adventure education and positive youth development has the potential to generate impactful synergies (Ardoin et al., 2022).

Rock Climbing as a form of adventure education

Rock climbing positively influences physiological, social, and psychosocial aspects, and there is an increase in coordination and strength as one of the potential physiological effects. Through the unique demands of rock climbing, involving unusual height experiences and responsibility and trust within the group, it can enhance concentration, focus, psychosocial aspects such as cooperation and respect, and create emotions like fear, excitement, and testing one's limits in a safe environment (Fruhauf et al., 2021).

People can rock climb in various environments, such as artificial walls indoors and outdoors and natural cliffs. Bouldering, a form of rock climbing with a height of up to 5 metres without needing a belayer, has a relatively low injury risk of 0.02 percent per 1,000 hours (Schof et al., 2013). Rock climbing in the context of school sports can provide meaningful experiences and a diversity of learning activities for students with high pedagogical benefits for those aged 13-16 years (Boudreau & Gibbons, 2019). Rock climbing can be implemented in facility-based environments, which supports a challenge-based pedagogical approach with choices for students; this includes increasingly challenging individual learning activities and a safe, collaborative environment (Boudreau & Gibbons, 2019).

There are opportunities for schools to integrate rock climbing into physical education. Considering the potential pedagogical benefits and the opportunity to provide meaningful experiences for students, integrating the adventure sport of rock climbing into physical education is worth exploring (Fruhauf et al., 2023).



Method

In this research, an interpretive constructivist approach was used, which facilitated the researcher to understand the experiences and perspectives of high school teachers in Pandeglang Regency, Banten, Indonesia, regarding the settings and barriers they face in developing positive youth through rock climbing activities. This approach enabled the researcher to construct meaning from the participants' perspectives in-depth. The interpretive paradigm emphasises understanding human experience and the subjective meanings individuals attach to their experiences, while the constructivist perspective posits that knowledge is actively constructed, not discovered (Shah & Al-Bargi, 2013).

Participants

The teacher participants were selected through a purposive sampling strategy, which is a non-probability sampling technique that selects participants based on specific criteria (Creswell & Creswell, 2018). The criteria for inclusion in the study were:

1. Minimum of 5 years of experience as a physical education teacher at the high school level.
2. Currently teaching physical education at a high school in Pandeglang Regency, Banten.
3. Equal representation of teachers who have integrated rock climbing into their physical education curriculum and those who have not.
4. Equal gender representation among the participants.

Procedure

The researcher and participants are seen as co-constructors of meaning. By adopting this approach, the researcher aimed to gain an in-depth understanding of the high school teachers' experiences, perspectives, and the meanings they ascribe to the settings and barriers they face in developing positive youth through rock climbing activities. This enabled the exploration of the nuances and complexities inherent in the teachers' experiences, acknowledging the context-dependent and socially situated nature of their perspectives and the research process. In the implementation, the researcher conducted semi-structured interviews with eight high school teachers in Pandeglang Regency, Banten, Indonesia, who have or do not have experience in adventure education. Through the interviews, the researcher was able to explore the teachers' understanding, experiences, and perspectives on the settings and barriers they face in developing positive youth through rock climbing activities.

Instrument

Semi-structured interviews were chosen as the primary data collection method as they allow for a flexible and interactive dialogue, enabling the researcher to explore the participants' experiences, perspectives, and the meanings they ascribe to the phenomenon in-depth. The interview protocol was developed based on the study's research objectives and the interpretive constructivist framework. It included open-ended questions that encouraged the teachers to share their experiences, challenges, and insights regarding the settings and barriers they face in developing positive youth through rock climbing activities in their physical education classes.

Open-Ended Questions

The interview guide included questions about the participants' experience of teaching rock climbing in physical education (e.g., "Please tell me about your experience with rock climbing in physical education, what positive development aspects are there in integrating rock climbing into physical education?"), the opportunities and development from integrating rock climbing in physical education (e.g., "What experiences can students gain when participating in rock climbing?"), and positive development (e.g., "What positive perspectives can students gain when participating in rock climbing?"). Follow-up questions were also asked (e.g., "What are the positive experiences of students participating in rock climbing, what positive feelings can students gain when participating in rock climbing?"). Furthermore, the interviewer could ask the participants for examples (e.g., "Can you give me an example?") or request more detailed descriptions (e.g., "Can you explain it further/more in detail?").



Data analysis

After the interviews, the results were transcribed word-for-word by the interviewer in the Indonesian language, before the data analysis was conducted. Each non-verbal communication, such as laughter or long pauses, was documented. The data was then analyzed using a Participatory Action Research (PAR) approach. PAR involves the active participation of the research participants in the process of data analysis and interpretation (Reason & Bradbury, 2001). The interpretivist constructivist perspective assumes that knowledge is co-constructed between the researcher and the participants, and that multiple realities and perspectives exist (Creswell & Poth, 2016). In this approach:

1. First, the primary author and the interview participants collaboratively read the interview transcripts to identify initial themes, drawing on their own experiences and perspectives.
2. Second, these initial themes were discussed with the participants to ensure accuracy of interpretation and gain deeper understanding of the meaning-making process.
3. Subsequently, the themes were collectively categorized and organized (e.g., 'social competence' and 'positive youth development aspects') through an iterative process of negotiation and consensus-building.
4. This process was repeated for all 8 interviews.
5. The final step was to confirm the analysis results with all the participants to obtain validation and feedback, further refining the interpretations.

By using the PAR approach within an interpretivist constructivist framework, the data analysis involves close collaboration between the authors and the research participants, ensuring that the multiple voices and perspectives of the participants are authentically represented. All interviews were analyzed in the Indonesian language, and the raw quotes have been translated into English.

Results

The researchers categorized the results into two main themes: positive youth development settings and barriers (Table 1). Positive youth development settings include physical and psychological safety and security, such as safety, environments that facilitate positive and supportive relationships with peers and adults, and environments where the community contributes to and connects with broader resources. Barriers include the risk of falling or injury, the nature of rock climbing activities, infrastructure, and safety. The teachers stated that they can promote positive youth development by considering the context and types of environments through adventure education.

Table 1. Themes, Sub Themes and Codes

Overarching theme	Theme	Subtheme	Code
Positive Youth Development Settings	Physical and Psychological Safety and security	Emphasizing physical	Safety considerations
		Emotional	Setting facilitate positive
			Supportive relationships with peers and adults
		Strong links between families, schools, and broader community resources	Settings that contribute to the community
			Connect with broader resources
		Barriers	Potential Barriers
	Limited time		
	Infrastructure		
Legal requirements	Specific training		
	Consent by parents		

		Cultural resistance
	Objective danger	Falls
Negative Aspects	Physiological aspects	Injury
	Teacher's perspective	Safety procedure

Positive Youth Development Settings for Integrating Rock Climbing in Physical Education

Positive youth development as an asset-based approach aims to optimize the well-being of adolescents in addressing current and future global perspectives. In addition to focusing on youth assets, positive youth development considers the context and types of environments that enable young people to develop these assets. The 5Cs model of positive youth development operationalizes multidimensional positive development through the assessment of competence, confidence, connection, caring, and character, which together lead to contribution and also develop the indicator of creativity (Lerner et al., 2005; Dimitrova et al., 2021). There is a great interest in the relationship between sports participation and positive youth development. The sport-based youth development model aligns the orientation and supportive actions of peers, parents, teachers, and coaches with development opportunities due to the context of sports participation (Coakley, 2014). Research findings indicate characteristics of sports activities that can contribute to youth development, including intensity, stability, continuity, and variation, which contribute to the relationship between sports participation and youth development.

The desire to participate in rock climbing, adopted as an Olympic sport, has seen a significant increase among adolescents, accompanied by a growing number of rock climbing infrastructures (Kwak, 2019). The increasing demand has significantly reduced limitations in space and risk (Lutter et al., 2020). Rock climbing positively influences muscle strength, endurance, and overcoming psychological limitations through the physical activity of rock climbing. In physical education, students who participate in rock climbing can enhance their creativity by exploring and climbing various types of routes. Rock climbing can comprehensively improve adaptive and meaningful problem-solving competencies in social and cultural contexts by providing physical experiences as positive adaptations of strength and hand-foot coordination in contact with the climbing surface, whether climbing vertically upwards or more horizontally on protruding climbing routes. This conceptualization is present in the positive youth development model as a set of skills and knowledge to develop adaptive and successful solutions among adolescents, given the dynamic socio-cultural demands and developmental challenges of adolescents in the global society. The positive youth development model has the potential to optimize and bring these skills and knowledge into broader aspects of adolescent growth and development (Dimitrova et al., 2021).

The outdoor rock climbing activity integrated into physical education promotes positive youth development and is physically and psychologically secure, with safe and clean environmental conditions. In addition, participants need to feel safe and free from threats of violence or harm. This setting psychologically enhances safe peer group interactions and reduces the likelihood of confrontational peer interactions. The interactions between adolescents and adults, as well as among adolescents, are constructive. The characteristics of the environment that primarily support positive youth development in physical education with outdoor education rock climbing activities are physical aspects, such as safety considerations. The emotional aspects include environments that facilitate positive and supportive relationships with peers and adults, and the community aspects include environments where the community contributes to and connects with broader resources.

Physical and Psychological Safety of Rock Climbing

The physical and psychological safety aspects of physical education with outdoor education rock climbing activities were described by all teachers, considering their background and experience in rock climbing as well as the students' practical experience. This aspect assumes practical experience as the most influential source, as it is highly influential in the rock climbing context. All students experienced the same climbing and belaying time during the half-day session. Two Physical Education teachers supervised the intervention with a brief orientation on general arrangements such as the time frame, group tasks, safety rules before, during, and after climbing, and relevant climbing techniques such as knots and

belaying. In this case, the intervention program followed the recommendations for school-based artificial wall climbing. If necessary, the Physical Education teachers provided physical assistance to facilitate the students' practical experiences, such as encouraging students to be brave when choosing the appropriate level of demand.

The program adopted a student-centred learning approach, which was instrumental in promoting positive youth development. This approach allowed students to freely choose their belaying groups and individual difficulty levels for the climbing routes. Research findings suggest that adolescents are particularly sensitive to the limitations of actions in climbing, and they can decide whether they can climb a particular route (Croft et al., 2018). To ensure the accuracy and appropriateness of the intervention, the two physical education teachers meticulously documented each form of intervention, noting the positive or negative significance during the intervention period regarding the behavioural interactions between students.

“Rock climbing is safe because it uses safety equipment, such as body harnesses and strong ropes with artificial walls, without falling rocks around. Teachers and peers assist students in climbing for the first time, starting by directing the climbing routes and belaying between students. Rock climbing activity demands that students be well-communicated because they perform various tasks, from climbing to belaying to group belaying. Students can see the trust between them in climbing as a sense of security from the environmental setting” (Hari).

Choosing the belaying group and individual difficulty levels for the climbing routes in a safe environment was explained by 16 out of 20 students. Climbing was considered the main physical and psychological safety benefit.

“Proper and intensive belaying practice can create a sense of security that can overcome the difficulty of the climbing route, which teachers adjust to the ability of each student to experience meaningful practice, which students may not obtain from other activities that have obstacles, such as the learning room inside the classroom” (Fanny).

Rock climbing offers physical experiences that positively adapt strength and hand-foot coordination as climbers come into contact with the climbing surface. Whether climbing vertically upwards or more horizontally on protruding climbing routes, the climbers' hands and feet coming into contact with the climbing surface is a positive experience, as explained by the physical education teacher.

“Students desire to reach the end of the climbing route while thinking about the right movements to minimize the risk of falling or injury” (Deden).

Emphasizing the physical aspect has been proven to be one of the practical factors in preventing health risks due to a sedentary lifestyle and maintaining fitness. Physical education teachers and students are very interested in determining whether the type and intensity of the exercise performed are sufficient to fulfil this task. Arief, as a teacher, explained how emphasizing the physical aspect as a crucial positive youth development setting in integrating rock climbing into physical education, as described below:

“I believe that rock climbing, in particular, has a positive influence in promoting positive youth development. For me, initiating active involvement in sports is very important to provide meaningful sports experiences and lifelong sports participation for adolescents” (Arief).

Climbers can describe the practical experience of rock climbing as an emotional perception that emphasizes the risks and dangers through movements they can use to distribute their body weight and save strength by using all parts of their body when climbing, as well as endurance to minimize the risk of falling or injury as a challenge on one side and the desire to feel individual happiness on the other.

“Climbers and belayers see social interaction in rock climbing as a positive thing, for example, during belaying. Communication between students facilitates positive relationships as a sense of security and safety, and a single student cannot do this. The height of the artificial wall reaches 10 meters, which can cause fatal risks. Teachers give students an understanding of what they need to do to complete the climb and reduce the risk of falling or injury. It gives teachers practical experience with the students, and they think this is an opportunity to provide support with peers and adults that students may not directly feel in other sports” (Eka).



Integration of Family, School and Community Efforts in Climbing

The sports context's characteristics and the parents' role in providing praise and supervision as positive influences, such as motivation and support, as well as negative ones, such as criticism and disturbance, may be possessed by parents towards their children in the sports context. Parents need to involve themselves in youth sports in the context of activities like rock climbing, which may have environmental and cultural aspects that can influence parental involvement. One of the factors is the need for more parental knowledge about alternative youth sports options. For example, parents may limit themselves or their children from engaging in alternative youth sports because they perceive the sports to be more risky when, in fact, the injury rate associated with rock climbing may be the same or relatively low. As a result, the lack of parental experience and information about alternative youth sports can contribute to avoiding sports as a 'trial and error' approach to learning sports outside the scope of sustained parental involvement. The knowledge gap from parental involvement in alternative youth sports, such as rock climbing, causes this.

Positive youth development settings show collaboration and synergy in various youth environments. When adolescents interact in environments such as family, school, and the surrounding environment with consistent characteristics and messages, positive youth development is more likely to occur. Participants reported that parental involvement in youth sports depends on a safe, clean environment that provides physical and psychological security. Some teachers stated that their schools are generally open to learning environments that promote positive youth development. The teachers explained this through rock climbing facilities, such as the availability of safety equipment, artificial walls, and a safe and clean environment, as described by one teacher:

"Our school has rock climbing facilities, namely safety equipment and artificial walls, which only a few high schools in Pandeglang own, and infrastructure, namely certified coaches, which are a special concern. Some teachers are often actively involved in rock climbing and share positive experiences with other students" (Yunita).

Schools with rock climbing facilities and infrastructure provide opportunities for those teachers to have experience teaching rock climbing in Physical Education, as shown by the previous quote from Yunita, "Some teachers are often actively involved in rock climbing and share positive experiences with other students."

"Schools must have certain facilities and infrastructure, such as rock climbing, which provides a context and environment enabling positive youth development. For me, rock climbing positively influences social interaction between students, teachers, and the environment, which can then contribute to the family and surrounding community environment" (Dadan).

Barriers to Integrating Climbing in Physical Education

There are several barriers reported by teachers from positive youth development settings, which are environments that actively promote the social, emotional, and cognitive development of young people, when integrating rock climbing into Physical Education. These barriers include organizational issues like group size, time, infrastructure and teacher competence, as well as parental support. Thus, the identified barriers differ between teachers and students. Negative aspects are considered by some participants as higher objective hazards compared to regular sports, different physiological aspects, and greater responsibility for physical education teachers.

Potential barriers

Positive youth development settings for the integration of rock climbing in physical education have barriers primarily identified from the organizational aspect, including lack of infrastructure, limited time in physical education, large class group sizes and lack of teacher competence. The lack of infrastructure is a barrier. The teachers mention that they participate in rock climbing. Some teachers who need to participate more in rock climbing are of particular concern because they experience more obstacles, for example, when providing safety guidance and supervision. Teachers who needed to participate more in rock climbing expressed more barriers than those actively involved.

"Limited infrastructure is one of the main reasons that limits my ability to teach rock climbing. With insufficient safety equipment, I will have to limit rock climbing activities, and there will be a lack of



competence and the need for assistance from trained teachers, one of which is minimizing risks. These factors are the main reasons for the lack of participation in rock climbing” (Pristiana).

Not many teachers can differentiate between bouldering and top rope climbing. Some teachers stated that the bouldering form of activity was more suitable than top rope climbing, as explained by this teacher:

“The number of students is quite large, and for me, there is a need for more safety equipment, for example, body protection and supervision, so that there are no mistakes in the top rope climbing activity. However, the bouldering activity does not have as many obstacles as top rope climbing, for example, safety equipment in mats and sufficient supervision for large classes” (Devi).

Time constraints are another obstacle to integrating rock climbing in physical education in positive youth development settings, such as directing the use of safety equipment, artificial climbing walls and less time for students to be physically active. Some teachers see that they will spend more time on technical matters in top rope climbing. Five teachers stated that movement time in physical education was the main factor in choosing activities. As one teacher explains in the following quote:

“I have not been able to integrate the top rope climbing activity into lessons because there is limited time to provide technical matters to students. “I believe that choosing an appropriate form of rock climbing activity is more feasible than top rope climbing, which requires much time and makes students lack time to move” (Fanny).

The next obstacle reported by two teachers is the possibility of discussing with parents when carrying out activities at height and steep climbing routes. Carrying out activities at height based on rock climbing on natural cliffs but at school using artificial walls up to 10 meters high also has the risk of falling or injury. This becomes a safety concern for parents (Dadan).

Negative aspects of climbing

The possibility of negative consequences or risks if there are errors in belaying was reported by seven teachers, the majority of whom stated that this obstacle had less climbing experience in physical education. The risk of injury is relatively low, and no teachers with climbing experience have reported harmful risks related to injury when doing rock climbing sports. Some teachers with less experience stated that they could not assess the dangers that might occur when doing rock climbing sports. One participant reported falling rocks as a hazard. However, teachers with experience in rock climbing use outdoor climbing wall infrastructure as a safe choice for learning. Exaggerated statements for students are potential climbing losses. This can happen especially to people who need more confidence and follow the teacher's instructions. One teacher shared his experience with exaggerated statements when climbing with students.

“I can describe my rock climbing experience as a challenge to students. They are in a large group, and it is not easy to do this individually. This can cause obstacles, such as trust and competence in completing group tasks and not wanting to embarrass themselves. It is important to provide supportive opportunities with peers and safe adults and reduce the possibility of confrontational peer interactions that may not be felt directly in other sports” (Deden).

The statements made by the physical education teachers are that students who think about the right movements to minimize the risk of falling or injury will have difficulty completing their climbing route. This can also happen to students who do not need to get group tasks requiring precise movements and safety.

“We ensure that the negative aspects of students who contribute less to their group tasks can pose a risk of falling or injury. However, most other students cannot complete their group tasks because they are not used to that pressure. The risk is that after 10-15 minutes, students can no longer make the right movements and fall from the artificial wall” (Devi).

One teacher who has rock climbing experience with his students, and the school explicitly supports the integration of climbing into physical education, says that he sees the main weakness of climbing in terms of safety:



“The obstacles and problems are more from the teachers' concerns about safety if they do not properly carry out the safety procedures and supervise the students. Adjusting to the infrastructure, the group size and whether it is possible to do top rope climbing by differentiating the form of climbing activities such as bouldering. I think the obstacles for bouldering are lower than for top rope climbing because the bouldering safety equipment is in the form of mats rather than top rope climbing which requires more safety equipment; this can minimize the risk of falling or injury and reduce safety concerns in students” (Arief).

Discussion

This study aims to describe the environmental settings and barriers through rock climbing that promote positive youth development in physical education in one of the high schools in Pandeglang Regency, Banten, Indonesia. All teachers stated positive youth development settings as environmental settings that promote positive youth development, such as increasing safe peer group interactions and reducing the possibility of confrontational peer interactions. The interaction between adolescents and adults is constructive, such as facilitating positive and supportive relationships with peers and adults. However, the majority stated that further reasons, such as infrastructure and safety procedures, were barriers to integrating rock climbing into physical education.

Results in alignment with the theoretical framework

Educators, academics, and policymakers recommend outdoor education to promote positive youth development. They see a natural alignment between outdoor education and positive youth development, and connecting these fields can produce positive synergies. Outdoor education consists of factors of experience-based learning, especially outdoors, challenge-based choice, and risk management (Williams & Wainwright, 2016). The physical education teachers interviewed explained the positive influence of rock climbing compared to traditional sports with positive youth development settings and experience-based learning, such as students being able to make responsible decisions and have character. This can improve positive social relationships based on self-determination theory. Students can engage in experience-based learning coupled with interactive guidance and reflective training, positively influencing outdoor education. Teachers have set outdoor education goals to achieve goals aligned with the competence and autonomy factors of self-determination theory. They considered the context and type of environment, namely experience-based learning outdoors, as a challenging factor in adventure education choices (Williams & Wainwright, 2016). Risk management becomes the fourth factor, a positive aspect reported by teachers with experience teaching rock climbing in physical education. Teachers with less experience teaching rock climbing see risk as a barrier and cause negative factors. This difference in perception indicates the need to incorporate risk management and its implications for the adolescent development phase into the teacher's learning program. The many risks of outdoor activities are not a barrier, as most teachers use indoor infrastructure. However, this finding allows students to make their own choices as a challenge factor to manage controlled risks. Positive youth development settings emphasize physical and emotional aspects, such as a sense of safety, as an essential factor in adventure-based learning; this is explained by not putting excessive pressure on students who lack confidence and physical strength (Legge, 2016).

Rock climbing as an intervention strategy to promote positive youth development

The benefits of positive youth development settings are especially in promoting physically and psychologically secure positive youth development with safe and clean environmental conditions. In addition, participants need to feel safe and free from threats of violence or harm. This setting psychologically enhances safe peer group interactions and reduces the likelihood of confrontational peer interactions to provide meaningful sports experiences and lifelong sports participation for adolescents (Acosta et al., 2021). One context that provides meaningful experiences in sports is enjoyment, challenge, physical aspects, and experiential learning by experiencing adventure activities, risks accompanied by a safe environment as positive risk-taking. Positive risk-taking in rock climbing refers to the calculated and controlled exposure to physical and psychological challenges, which can contribute to the development of resilience, problem-solving skills, and self-confidence in children and adolescents (Duell & Steinberg,



2018). Adolescence is a period of growth, learning, exploration, and extraordinary opportunities for adolescents to develop lifelong knowledge, attitudes, and skills (Graham et al., 2020). Interventions for adolescents require an understanding of risks and how to acquire and possess skills to promote positive development. Various positive youth development programs can be tailored to the diverse needs of adolescents across environmental and cultural contexts. Positive youth development interventions are based on the philosophy that every individual is capable of positive change. Positive youth development is a comprehensive approach to interventions in the social environment. Positive youth development as a prosocial educational approach such as social-emotional and character learning and development (Waid & Uhrich, 2020). Recent research emphasizes the need to provide health-promoting behaviours in adolescence that address developmental changes during adolescence. Developmental goals can include the need for new and interesting experiences, as well as motivation to gain status, prestige, and respect in terms of social recognition, so as to provide motivation to learn prosocial behaviors (Dahl et al., 2018). Prosocial behaviors such as taking responsibility for fellow students in climbing are identified as a positive influence of rock climbing sports. Therefore, rock climbing can be a strategy that enables the goal of positive adolescent development change and provides meaningful experiences in physical education (Fruhauf et al., 2023).

In addition to these positive aspects, there are potential negative aspects that are of concern. Although no students experienced injury or falling during rock climbing, the higher objective risk in rock climbing is often seen as a negative aspect. This makes the responsibility in rock climbing considered higher than in other sports. The sense of responsibility is greater, as students need to carefully consider the right movements to minimize the risk of falling or injury, which can be difficult for students who are not used to performing group tasks that require precise movements and safety procedures. Thus, the bouldering form of rock climbing activity provides fewer barriers to integration into physical education. Research shows that the bouldering form of rock climbing activity has a positive effect on self-efficacy and well-being for adults experiencing depression (Karg et al., 2020; Kratzer et al., 2021). Potential negative physical aspects may occur due to excessive pressure, especially for students with lower strength or limited training capacity. However, rock climbing is recommended for individuals with physiological and psychological limitations, with a focus on the structure of rock climbing activities. The structure of rock climbing activities includes proper equipment, trained instructors, and safety protocols, which are designed to provide sufficient rest time and avoid excessive tension for students (Oriel et al., 2018). Individual learning activities must include increasingly challenging learning tasks as well as a safe and collaborative environment. The context of challenge in rock climbing activities is physiological, as the majority of students are not yet accustomed to hanging activities and feeling their own body weight. Rock climbing in the context of physical education can provide meaningful experiences for students and a diversity of learning activities that promote positive youth development (Boudreau & Gibbons, 2019). Considering the opportunities for adventure sports with physical education teachers involving students and providing opportunities to learn about risk management, safety procedures, decision making, and social competence can also be physically active in outdoor environments (Schwab & Dustin, 2014). This is in line with the development of creativity assessment indicators in positive youth development, such as the ability to solve adaptive and meaningful problems in social and cultural contexts (Said-Metwaly et al., 2017). The results of this study will provide recommendations for the context and type of environment of outdoor education intervention programs in Indonesian schools. Rock climbing has the potential to be relevant to youth culture and as a constructive non-aggressive activity. The positive influence of rock climbing identified in several studies recommends a shift in the curriculum to integrate more sports relevant to adolescents, one of which is adventure sports (Beaumont & Warburton, 2019).

Practical Implications

Various research results show that designers can focus youth sports programs on three outcomes: developing skill levels, maintaining participation, and enhancing personal development (Cote & Hancock, 2014). However, teachers still need to be made aware of the benefits of positive youth development settings, as they see it as a barrier to integrating sports programs designed to focus on positive youth development, one of which is rock climbing. There needs to be more perspective regarding setting a safe and clean learning environment that provides physical and psychological safety and security. Selecting rock climbing activities such as bouldering is more accessible to implement than top rope climbing, and teachers need to communicate this information. By knowing the various forms of rock climbing activi-



ties, teachers can gain confidence and a sense of safety in instructing students to minimize safety concerns and limited infrastructure. In Indonesia, the Central Board of the Indonesian Rock Climbing Federation (PP FPTI) collaborates with the West Java Provincial Board of the Indonesian Rock Climbing Federation in West Java Province to hold rock climbing instructor training for high school and vocational school teachers. After participating in this training, teachers can focus more on planned programs and emphasize rock climbing knowledge (PP FPTI, 2017). Integrating adventure education into physical education, such as at the university level, can increase the self-efficacy of physical education teacher candidates to teach adventure education in the future. Therefore, integrating rock climbing into physical education teacher education can provide confidence and competence to teach rock climbing in schools (Hovey et al., 2020). Some teachers are concerned that students will not get enough moderate to vigorous physical activity (MVPA) through rock climbing. The level of physical activity during adventure sports lessons shows the highest percentage of moderate to vigorous physical activity (MVPA) comparable to physical activity in fitness centres. This includes practising rock climbing equipment on vertical walls or similar parts that require a belaying partner. The amount of moderate to vigorous physical activity (MVPA) in height activities (40%) is similar to game sports activities such as basketball (37%) and badminton (40%). Feedback from teachers to students and focusing on effective benefits such as social development can increase motivation and enjoyment and moderate to vigorous physical activity (MVPA) in adventure education (Gehris et al., 2012; Fruhauf et al., 2023).

Limitations

The limitation of this study is that only some teachers are aware of the learning environment settings based on positive youth development settings, which consider the context and type of environment that enables positive youth development. For example, the context in selecting rock climbing activities that can be taught to minimize safety concerns includes bouldering, which does not require anchoring but uses mats as a safety factor and provides a physically, psychologically, and environmentally safe and clean environment. This setting psychologically enhances safe peer group interactions and reduces the possibility of confrontational peer interactions. In addition, the researchers only based the research results on interviews; they did not conduct any field observations, such as physical education classes or use further data collection methods. Readers should avoid generalizing the results of this study because qualitative research is used to examine problems in detail and in-depth but cannot be used to make empirical statements about the entire population (Fruhauf et al., 2023).

Conclusions

This study aimed to describe the environmental settings and barriers through rock climbing that promote positive youth development in physical education in one of the high schools in Pandeglang Regency, Banten, Indonesia. All the teachers interviewed reported the implications of positive youth development settings through rock climbing that are aligned with the positive youth development model, considering the context and environment that allows adolescents to develop these competencies. Interventions for adolescents require understanding the risks and how to acquire and possess the skills to promote positive development. Researchers can adapt various positive youth development programs to the diverse needs of adolescents across environmental and cultural contexts. Although the contextual factors of the positive youth development model through rock climbing still needed to be fully met, the majority of teachers chose the top rope climbing form of rock climbing activity over bouldering. Knowing the various forms of rock climbing activities provides confidence and a sense of safety in instructing students to minimize safety concerns and limited infrastructure. Various aspects appear attractive in rock climbing, such as relationships and trust with peers and adults and the ability to create a sense of safety and experience activities at height. However, potential negative aspects, such as the risk of falling and placing a high responsibility on teachers, pose barriers to school rock climbing sports. The bouldering form of rock climbing activity has fewer barriers, especially in the limited infrastructure in schools. However, various sports interventions can consider the context and type of environment and the positive development of student competencies. Providing insights into the significance of organized public



spaces in enhancing youth's physical, emotional, and psychological well-being the development of more inclusive programs.

Researchers need to analyze the perspective gap further regarding the learning environment setting in teacher education. There is a need to develop intervention programs to understand how to create structured programs from a positive youth development perspective through more sports relevant to adolescents, including adventure sports. Further research is needed to disseminate and refine this strategy. Positive youth development settings through sports interventions aim to promote the development of adolescent competencies and provide meaningful sports experiences and lifelong sports participation for children and adolescents. The implications of these findings recommend positive youth development research in various demographics through outdoor education to strive to remain renewed and aware of new perspectives in positive youth development research (Dimitrova & Wiium, 2021).

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