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The Effectiveness of Outdoor-Based Project-Based Learning (PJBL) to Improve School Well-Being in Elementary Schools

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Abstract

Current education prioritises student welfare as the central focus in establishing an optimal learning environment. This research endeavours to assess the efficacy of the Outdoor-based Project-Based Learning (PjBL) model in enhancing School Well-being within Elementary Schools. This study adopts a pre-post-test control group design using a quantitative, quasi-experimental methodology. Research instruments are grounded in Allardt's theory of welfare, encompassing dimensions pertinent to school well-being. The sample comprises 36 fourth-grade students for piloting the School Well-being instrument, with an experimental cohort hailing from Class 5A (31 students) and a control cohort from Class 5B (30 students). Findings reveal a noteworthy disparity between the PjBL and control groups ($F=292.588$, $p < 0.001$). Notably, the PjBL group consistently exhibits superior mean scores across all facets of School Well-being, encompassing Having, Loving, Health Status, and Being, relative to the control group. Furthermore, the N-Gain score substantiates a significant divergence: the PjBL group attains 83% (categorised as high), while the control group registers 62% (categorised as medium). These outcomes underscore the efficacy of the outdoor-based PjBL model in ameliorating student learning outcomes. The pragmatic implications of this study underscore the importance of embracing pedagogical approaches that accentuate experiential learning and extracurricular interactions as viable strategies to bolster overall School Well-being and foster student development.

Introduction Section

Education has undergone a notable transformation, with a pronounced shift towards prioritising student welfare as the primary concern in cultivating an enabling learning milieu. This shift reflects a heightened awareness of the significance of psychological factors and student well-being as pivotal drivers shaping educational paradigms. Departing from traditional models centred on academic knowledge; this evolution heralds an approach emphasising student experiences and well-being. The evolving social dynamics and the imperative to adapt to increasingly intricate learning environments underscore the criticality of attending elementary school student welfare (Smith, 2021).

The prevalence of high academic pressures, waning student engagement, and escalating stress levels present challenges that impede student attendance, dampen learning motivation, and compromise academic attainment (Brown, 2020). In this context, schools are not merely purveyors of knowledge but also play an instrumental role in nurturing students' character and talents (Handayani, 2021). Consequently, fostering a conducive learning atmosphere within schools is paramount in eliciting optimal student development (Rahayu, 2022). Confronting the complexities of modern education, the accentuation on well-being emerges as a pivotal tenet in ameliorating elementary school students' welfare (Rahman, 2023).

As Konu (2002) posited, school well-being encapsulates a concept that encompasses factors influencing student welfare by addressing their fundamental needs within the school environment. These basic needs span four dimensions: having, loving, being, and health status. Cultivating a positive psychological ambience within the school setting is central to fostering a sense of contentment during students' engagements (Rahmi, 2021). Indeed, favourable school conditions motivate students, exerting a discernible impact on academic achievement (Anditiasari, 2021). The notion of school well-being encompasses the creation of a psychological milieu within the school premises that engenders a sense of felicity during scholastic pursuits (Rahmi, 2021). Such conducive school conditions invigorate students and educators and contribute to enhanced academic performance (Anditiasari, 2021). Indeed, the school environment profoundly influences students' psychological disposition, as favourable conditions breed feelings of comfort and tranquillity conducive to the learning process.

Djamarah (Devita, 2022) delineates conventional learning as the traditional instructional approach reliant on the lecture method for oral communication between educators and learners. However, conventional learning often exhibits

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limitations that impinge upon student welfare within the educational milieu. Notably, the predominantly passive nature of conventional learning, coupled with the exclusive focus on teacher-centric delivery, engenders a static and unengaging learning environment. This monotony and lack of interactivity render the learning experience mundane and uninspiring, dampening students' intrinsic motivation to participate actively. Moreover, the perceived disconnect between academic content and its applicability to real-life scenarios complicates the integration of theoretical knowledge with practical experiences.

Furthermore, the inflexible nature of conventional learning methodologies exacerbates challenges in accommodating diverse learning styles among students. Each student possesses a unique learning disposition; however, conventional pedagogical approaches often adopt a one-size-fits-all methodology, which may not resonate with all learners. This incongruence between instructional delivery and students' individual learning preferences undermines the efficacy of conventional learning methods, resulting in suboptimal learning outcomes.

According to Wisudawati (2022), Natural Sciences (IPA) encompass a discipline that melds experimental (inductive) and theoretical (deductive) approaches. Conversely, as articulated by Sayekti (2019), the crux of science transcends the mere accumulation of facts and concepts; it necessitates a generalisation process. Science education catalyses fostering students' curiosity and nurturing critical, objective problem-solving skills. In parallel, Sayekti (2015) underscores the pivotal role of science education in shaping students' character, as it embodies the essence of scientific attitudes closely aligned with the principles of character development.

Despite these merits, students encounter impediments, as highlighted by Afifah (2021). Inappropriate instructional strategies and methods often fail to leave a lasting impression on students' cognitive faculties. Many educators still rely heavily on didactic approaches and rote practice, which inadvertently hinder students' comprehension of fundamental concepts. Consequently, there exists a pressing need to revamp the delivery of scientific content, with a particular emphasis on integrating project-based applications to enhance student engagement and participation in the learning process.

To tackle the challenges confronting student well-being in primary education, a shift towards innovative educational paradigms has garnered substantial attention. Project-Based Learning (PjBL) emerges as a prominent student-centered approach. PjBL underscores a learning methodology prioritising experiential learning and collaborative projects relevant to everyday life (Thomas, 2019). Redkar (Widana, 2021) characterises PjBL as a model centred on intellectual and cognitive processes aimed at problem-solving, thereby fostering the development of applicable concepts.

Rafsanzani's work (2020) aligns with this perspective, affirming PjBL's efficacy in enhancing students' environmental awareness and cognitive faculties. Notably, Yuni (2019) asserts that PjBL expedites comprehension of subject matter compared to traditional instructional methods, attributing this to its emphasis on practical engagement. In the PjBL framework, teachers assume the role of facilitators, guiding students to navigate their learning journey (Widodo, 2021). Within this pedagogical framework, students can articulate ideas, explore novel concepts, and receive positive cognitive and physical stimuli (Amelia, 2021). The resultant processes and products serve as invaluable learning resources that enrich and invigorate student learning experiences, contributing to character development (Susilo, 2020).

In implementing innovative learning models, educators must carefully consider methodologies tailored to the learning environment, including integrating outdoor-based learning to bolster student welfare (Anditiasari, 2021). Conventional didactic approaches often fall short of capturing students' interest and attention, particularly in elementary settings. Hence, educators must embrace innovative student-centred learning modalities like PjBL, which have demonstrated efficacy in captivating students' attention and fostering deeper learning (Chen, 2021).

Outdoor learning entails an immersive educational activity that encourages students to observe and apply lesson concepts within their immediate environment, thus anchoring learning in their own experiences. Utilising nature, the social milieu, and interactions with diverse natural scenarios as learning resources, outdoor learning cultivates students' curiosity and exploration whilst fostering the development of social, emotional, and cognitive skills (Zamzow, 2020). As articulated by Smith (cited in Sumarni, Erlangga, 2023), field studies offer the distinct advantage of translating classroom-taught concepts into real-world applications. Similarly, Zakian's research (2022) underscores that learning beyond the confines of the classroom enables students to imbue learned concepts with real-world relevance, enhancing engagement and excitement.

Engaging students within a liberated outdoor environment, as advocated by Hasmyati (2018), holds promise for enhancing mental and emotional well-being and mitigating stress levels. This is attributed to the immersive nature of outdoor learning, which affords students direct interaction with nature, enriching their learning experiences and nurturing their welfare. By leveraging outdoor methodologies, educators broaden students' learning horizons, foster their curiosity, and deepen their connection with the natural world, thereby bolstering social and emotional competencies (Brown, 2020).

Moreover, outdoor learning serves as a platform for synthesising academic knowledge with practical application beyond the classroom, fostering student engagement and augmenting well-being within the school environment. Consequently, educators are encouraged to exhibit creativity and innovation in selecting appropriate learning strategies to enhance student welfare.

Implementing outdoor-based Project-Based Learning (PjBL) presents many challenges, encompassing resistance from students accustomed to conventional learning methods to logistical hurdles for educators (Sudarmanto, 2021). Procuring additional resources such as transportation, tools, and materials can sometimes prove arduous. Moreover, educators may grapple with heightened administrative burdens, including fund management and logistical coordination

(Uno, 2022). Some students may necessitate additional motivation or interest to engage with learning topics beyond the classroom setting (Hamdayama, 2022). Given existing teaching obligations, educators require extended time to devise and execute outdoor learning initiatives (Zakian, 2022). Furthermore, educators who require upskilling in technology may benefit from additional training to effectively integrate technological tools into their pedagogical practices. Notably, the inherent risks associated with outdoor learning, such as student safety during field trips or exploration activities, warrant careful consideration (Mann, 2023).

Educators can navigate these obstacles despite these challenges by adapting learning models through various strategies. Notably, leveraging the Project-Based Learning model in conjunction with outdoor methodologies holds promise as a viable solution, potentially positively impacting school well-being (Dewi, 2023). While PJBL has gained traction within traditional classroom settings, there is burgeoning interest in exploring its efficacy when applied outdoors. Domoucher contends that outdoor learning fosters students' environmental sensitivity through direct field observations (Fauzi, 2021). However, further research is imperative to ascertain its effectiveness in enhancing school well-being, particularly in elementary school. Hence, this research endeavours to assess the efficacy of outdoor project-based learning in bolstering the well-being of elementary school students.

Method

Design

The quantitative research uses a quasi-experimental method with a pre-post-test control group design. The research design is presented in Figure 1.

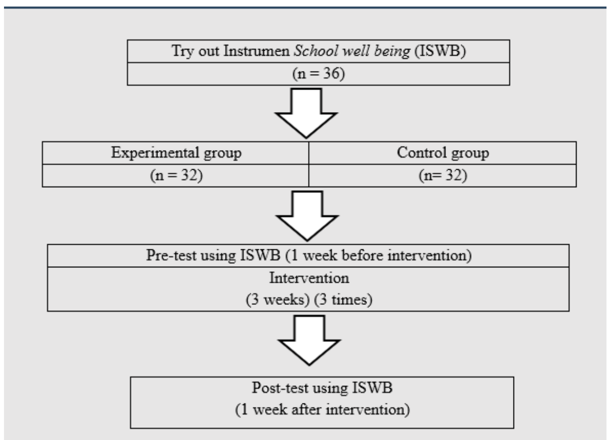

Figure 1. Research design

This research was conducted at SD Muhammadiyah Sruni 22 Surakarta, employing convenience sampling as the selection method. A total of 36 Grade 4 students participated in testing the school welfare instrument. Subsequently, the experimental group, comprising 31 students, was assigned to Class 5A, while the control group, consisting of 30 students, was assigned to Class 5B.

Figures and tables

Instrument

This research utilises instruments grounded in "Allardt's theory of welfare", as conceptualised by Konu & Rimpelä (2002). According to this theory, School Well-being encompasses four key dimensions: school conditions (having), social relationships (loving), means of achieving oneself at school (being), and health status. The research methodology involves several sequential steps. Initially, researchers devised instrument index indicators aligned with the four dimensions of school well-being. Subsequently, experts evaluated the instrument to ensure its validity and reliability. Finally, the revised instrument was piloted on 36 Grade 4 students to assess its suitability and validity in gauging school well-being.

Procedure

The research took place from 16th October to 6th November 2023 at SD Muhammadiyah 22 Sruni Surakarta. Before commencing the study, the researcher obtained permission from the Principal and relevant teachers. The research comprised several procedural stages. Initially, the instrument was piloted on 36 Grade 4 students. Before implementing the intervention, pre-tests were administered to classes 5A and 5B to gauge students' initial well-being levels. Class 5A (experimental group) underwent outdoor-based PjBL learning for three sessions, while class 5B (control group) adhered to conventional learning methods. Data collection occurred twice for both groups: one week prior to the intervention and one week following its completion. Post-test data was then gathered from both classes to evaluate the intervention's impact on class 5A (PjBL) and class 5B (conventional learning). Subsequently, an analysis was conducted to compare score differences between the pre-tests and post-tests of both groups, assessing the intervention's effectiveness. The research also solicited responses and feedback from participating teachers and students to glean additional insights into the efficacy of the implemented learning methods.

Intervention

The researcher provided outdoor-based PjBL learning to the experimental group (5A) in 3 meetings for 105 minutes (3x35). The following is the Learning Implementation, which can be seen in (table 1).

Table 1. Outdoor-based PJBL learning steps

Time	Material	Core Activities
1st meeting (1x35 minutes)	Determine the magnetic properties of an object	**Syntax 1: Basic questions** 1. Students are asked, 'Do you know what a magnet is?' **Syntax 2: Design product planning** **2.** Students were formed into 5 groups to work on LKPD about determining the magnetic properties of objects around them. **Syntax 3: Create a creation schedule** **3.** Students carry out experiments outside the classroom with their groups and are given 20 minutes. **Syntax 4: Monitor project activity and progress** 4. The teacher monitors each group to monitor progress and guide them if they experience difficulties. **Syntax 5: test results** 5. Each group presented the project results, and the teacher helped evaluate them. Student and teacher doing reflection.
2nd meeting (1x35 minutes)	Use of magnets in everyday life	**Syntax 1: Basic questions** 1. Students were asked, 'Did you know that in everyday life, we use magnets?' **Syntax 2: Design product planning** 2. Students were divided into 5 groups to work on LKPD about analysing the use of magnets in everyday life. **Syntax 3: Create a creation schedule** 3. Students are given 20 minutes to discuss their LKPD work in groups outside of class. **Syntax 4: Monitor project activity and progress** 4. The teacher monitors each group to monitor progress and guide them if they experience difficulties. **Syntax 5: test results** 5. Each group presented the project results, and the teacher helped evaluate them. Student and teacher doing reflection.
3rd meeting (1x35 minutes)	How to make magnets	**Syntax 1: Basic questions** 1. Students were asked, 'Have you ever made your magnets using simple materials?' **Syntax 2: Design product planning** **2.** Students were divided into 5 groups to work on LKPD on how to make magnets. **Syntax 3: Create a creation schedule** 3. Students are given 20 minutes to discuss their LKPD work in groups outside of class. **Syntax 4: Monitor project activity and progress** 4. The teacher monitors each group to monitor progress and guide them if they experience difficulties.

Syntax 5: test results

5. Each group presented the project results, and the teacher helped evaluate them.
6. Student and teacher doing reflection.

Data analysis

The data were analysed using the SPSS statistical program. Initially, the validity and reliability of the instrument piloted in Class 4 were assessed. The validity test yielded validation for 20 questions. Subsequently, Cronbach's Alpha coefficient was calculated, resulting in a value of 0.70, indicating the instrument's reliability. Following this, the data underwent analysis utilising univariate general linear model (GLM) ANOVA and N-Gain tests.

Results

This research was conducted in two stages. During the first stage, a pre-test was administered before engaging in learning activities on magnetic materials. The experimental class (5A) utilised outdoor-based PjBL, while the control class (5B) employed conventional methods. The outdoor-based PjBL learning activities were facilitated through prepared teaching modules, which had been evaluated by subject teachers beforehand. This ensured the teaching and learning process was meticulously planned and structured, allowing adjustments to accommodate students' needs. The learning activities comprised preliminary, core, and concluding (Table 1). Throughout the learning process, the researcher was monitored by the teacher to provide guidance and support and to ensure adherence to the predetermined plan. This monitoring also facilitated adjustments or improvements as necessary in response to any difficulties encountered during learning.

In the second stage, a post-test was administered to assess the effectiveness of the two learning methods in enhancing school well-being. The collected data were subsequently analysed using SPSS version 23, employing univariate general linear model (GLM) ANOVA and N-Gain tests to gauge the increased understanding of magnetic materials concepts.

Furthermore, the outdoor-based PjBL learning process was executed using prepared teaching modules evaluated by subject teachers prior. This rigorous process ensured that the teaching and learning activities were well-planned and structured, enabling adjustments to cater to the students' varying needs. The learning activities encompassed introductory, core, and concluding phases. The teacher closely observed the learning process and documented all classroom and student activities (refer to Table 1).

Table 2 displays the scores for the Index of School Well-being (ISWB) across two distinct groups, the experimental and control groups, focusing on four key aspects: Having (W), Loving (X), Health Status (Y), and Being (Z). At Time 1 (pre-test), the scores between the experimental and control groups were comparable. The experimental group yielded an average score of 68.67 (SD: 4.020), while the control group scored 67.42 (SD: 1.893), indicating no significant disparity. However, at Time 2 (post-test), following the implementation of the outdoor-based Project-Based Learning (PjBL) model concerning magnetic materials, a substantial increase in scores was observed across all aspects within the experimental group. The total average score surged to 92.20 (SD: 2.325). Conversely, while the control group also demonstrated an increase in scores, the rise was not as pronounced, with an average score of 70.35 (SD: 1.841). This analysis underscores the effectiveness of the intervention in the experimental group, suggesting a noteworthy improvement in student well-being compared to the control group. These findings highlight the potential positive impact of the outdoor-based PjBL learning model on enhancing student well-being.

Table 2. ISWB scores by group and time (time 1 and time 2)

Group	Time 1		Time 2	
	m	sd	m	sd
Having (W)				
Experiment	16.85	1,352	22.83	,950
Control	16.61	,983	17.74	,855
Loving (X)				
Experiment	17.36	1,550	23.33	,884
Control	17.19	1,078	17.87	,806
Health Status (Y)				
Experiment	17.03	1,140	22.97	,765
Control	16.74	,729	17.45	,723
Being (Z)				
Experiment	16.79	1,485	23.07	1,048
Control	16.87	1,204	17.48	,890
Total ISWB				
Experiment	68.67	4,020	92.20	2,325
Control	67.42	1,893	70.55	1,841

Table 3 presents a comparative analysis of scores between the experimental group, which underwent outdoor-based Project-Based Learning (PjBL), and the control group across four dimensions: Having (W), Loving (X), Health Status (Y), and Being (Z). The results reveal that the PjBL group exhibited markedly higher average scores in each aspect compared to the control group. Specifically, the average scores for the PjBL group were 20.56 (Having), 20.69 (Loving), 20.60 (Health Status), and 20.95 (Being), whereas for the control group, they were 15.72 (Having), 15.60 (Loving), 15.40 (Health Status), and 15.34 (Being). Importantly, all these differences demonstrated a very high significance level, with p-values less than 0.001 in each aspect. These findings unequivocally indicate that utilising the PjBL method consistently positively and significantly enhances student welfare across various dimensions compared to the conventional method employed by the control group.

Table 3. ISWB scores according to experimental and control groups

Aspect	PjBL	Control	
	Means	Means	*P*
Having (W)	20.56	15.72	< 0.001
Loving(X)	20.69	15.60	< 0.001
Health Status (Y)	20.60	15.40	< 0.001
Being (Z)	20.95	15.34	< 0.001

The Univariate GLM ANOVA analysis assessed the disparities in student learning outcomes regarding School well-being between the PjBL (Project Based Learning) and the control groups. The findings revealed a significant difference between the two groups ($F=292.588$, $p< 0.001$). A high F value indicates that the variation between the PjBL and control groups surpasses the variation within them. Moreover, a p-value of less than 0.001 affirms that the disparity between the PjBL and control groups is unlikely to be attributed to chance alone. These results underscore that using outdoor-based PjBL methods significantly influences the enhancement of School well-being compared to conventional learning methods in the control group.

Furthermore, N-Gain score analysis was conducted to gauge the impact of PjBL versus the control group in augmenting school well-being (refer to Table 4). The outcomes exhibited notable disparities between the experimental group (PjBL) and the control group concerning efforts to elevate school well-being. The experimental class achieved an N-Gain score of 83%, categorising it as high, while the control group attained 62%, classified as medium. These findings elucidate that the PjBL method exerts a substantially more effective influence than the control method in enhancing School well-being. The high N-Gain score in the PjBL group signifies a significant escalation in school welfare facilitated by this learning approach. It furnishes compelling evidence that implementing the PjBL method in this context yields a positive impact and is more efficacious in enhancing School well-being than conventional learning methods employed in the control group.

The T-test analysis was employed to compare the means between two distinct groups. Table 5 presents the results of the omega-squared value, indicating a significant contribution from the PjBL (Project Based Learning) model in enhancing School well-being within the experimental class, with a value of 85.36%. This illustrates that the PjBL method markedly contributes to improving school welfare. A high omega-square value signifies how much the PjBL model can elucidate the variance in school well-being. These findings validate that this method exerts a robust and significant influence on enhancing school welfare. Implementing the PjBL model is pivotal in augmenting School well-being within the experimental class, underscoring its positive and substantial contribution to the student learning environment.

Discussion

Outdoor-based Project-Based Learning (PjBL) stands out as a learning strategy that actively engages students in learning, thereby impacting long-term memory retention. Vera (Astuti, 2022) noted that outdoor-based learning activities yield learning outcomes that endure in students' long-term memory due to their involvement in various cognitive processes such as memorisation, writing, exploration, experimentation, and application. Similarly, Widyaningrum (2021) elucidated that project-based learning fosters an environment of enjoyment, curiosity, significance, and critical thinking, facilitating deeper comprehension of the material. Supported by relevant research by Lestari (2016), outdoor-based PjBL stimulates students to actively participate and engage in learning beyond the classroom confines, fostering a conducive and enjoyable atmosphere to enhance student learning outcomes. Thus, further investigation is warranted to ascertain the efficacy of outdoor-based PjBL in enhancing school well-being.

The research findings, as evidenced by the N-Gain scores, demonstrate that the experimental class achieved a remarkable 83% in the high category, contrasting with the control group's 62% in the medium category. This underscores the significantly superior influence of PjBL over conventional methods in enhancing school well-being. Consistent with Fitrina (2016), implementing the outdoor-based PjBL learning model is associated with heightened critical thinking abilities compared to traditional learning approaches. These outcomes align with Mega's (2019) observations that student engagement in the experimental class was notably heightened due to the innovative, creative, and stimulating nature of PjBL learning, contrasting with traditional methods. This echoes Grabel's (2017) assertion of a positive correlation between student welfare and academic achievement. Additionally, as Ode (2017) emphasised, collaborative learning positively impacts student engagement, fostering active participation and interest in the learning process. Hence, it is imperative to implement programs promoting school well-being to meet students' diverse needs, fostering happiness and enhancing their overall well-being.

The Having (W) aspect reveals a significant disparity between the experimental group (PjBL) and the control group, with average values of 20.56 and 15.72, respectively. This distinction is underpinned by fulfilling impersonal needs and material conditions on a broad scale, crucial for supporting the school's well-being. As Cuyver (Hina, 2023) highlighted, schools with inadequate infrastructure often exhibit diminished well-being levels, whereas those with superior facilities tend to fare better. Providing adequate school facilities is anticipated to enhance student satisfaction with their learning environment. Furthermore, insights from Sabilla (2019) underscore that certain students may experience discomfort with the school's schedule and assignments, emphasising the importance of evaluating this aspect in terms of students' comfort with the learning process, encompassing factors such as scheduling, break times, assignments, and teaching methods. Some students may express dissatisfaction with school infrastructure, including classroom conditions, school services, and facilities, contributing to noise disturbances that impede concentration. Addressing these concerns necessitates evaluation to foster effective communication between students and teachers, thereby cultivating a safe and comfortable environment conducive to the learning process.

The loving aspect (X) exhibits significant disparities between the experimental and control groups, with average values of 20.69 and 15.60, respectively. The data underscores that the class employing the outdoor-based PjBL learning model yields a higher average score than the control class utilising the conventional model. Numerous studies corroborate the PjBL model's efficacy in significantly enhancing social and academic dimensions (Duke, 2017; Artika, 2023). Additionally, findings by Zhang (2023) affirm that PjBL yields superior student learning outcomes relative to conventional models. As highlighted by Na'imah (2017), adolescents necessitate robust social relationships with teachers and peers, indicative of the potential of outdoor learning to bolster the "loving" aspect by fostering diverse learning experiences that broaden social interactions.

Moreover, PjBL activities integrating teamwork can foster the development of social and emotional bonds, as emphasised by Sadijah (2021), who underscores the pivotal role of parental emotional support, encompassing comfort, affection, and empathy, in inspiring students and influencing their motivation and enthusiasm in the learning process. Supporting this notion, Nugraheni (2020) posits that students' social interactions in the home and school environments significantly impact their well-being. However, these findings also unveil vulnerabilities among certain students from excessive workloads at home and school, warranting attention to mitigate adverse effects on their well-being.

Table 4. N-Gain Scores of Experimental and Control Groups

Group	N	Means	N-Gain Score (%)	Category
PjBL	30	20.75	83	Tall
Control	31	15.53	62	Currently

Table 5. Effective contribution of the experimental group

Omega-squared	Enter	Output (%)
t score	21.34	85.36

Health is paramount in overall well-being, particularly amidst unpredictable weather conditions where maintenance is imperative. Health status encompasses physical and mental dimensions, encompassing psychosomatic conditions, chronic ailments, minor illnesses (such as flu), and individual self-perception (Konu, 2002). Within the health status (Y) aspect, a notable disparity was observed between the PjBL and control groups, with average values of 20.60 and 15.40, respectively. Burhana (2021) highlighted that engaging in activities beyond the classroom purview can foster positive emotions and alleviate stress, thereby fostering feelings of happiness. Nevertheless, insufficient attention to health-related concerns persists in many educational settings. Schools ought to enhance the effectiveness of health-focused programs, such as UKS initiatives, to ensure students learn in optimal physical and mental states (Rasyid, 2020).

Being (Z) reflects students' enthusiasm and self-esteem when participating in outdoor-based PjBL learning. The study revealed a significantly higher average in the experimental group than the control group, with values of 20.95 and 15.34, respectively. Echoing the findings of Septyaningrum (2021), students' curiosity and interest in learning denote a heightened enthusiasm for academic pursuits. Motivated learners are inclined to satisfy their needs by cultivating interests and honing talents. This research underscores that students exhibit greater interest in learning beyond the classroom setting, as they can engage directly in practical experiences, thus applying theoretical knowledge in real-world contexts. Moreover, learning outside the classroom offers a more stimulating experience, fostering motivation and enthusiasm for learning.

The outcomes of this study corroborate the assertions made by Dariyo (2018), who posits that school well-being significantly influences students' academic engagement. Enhanced overall well-being among students at school correlates with heightened levels of learning activity. Furthermore, as highlighted by Purnomo (2018), students with elevated levels of school well-being tend to exhibit robust motivation for learning and nurturing interests and talents. School well-being levels hold sway over various academic outcomes, encompassing school attendance, prosocial behaviour, environmental safety, and mental health (Cahyono, 2021). The nexus between school well-being and academic 'flow' underscores the significance of satisfaction levels within the learning experience and fostering a positive outlook towards the school environment to enhance well-being. This, in turn, facilitates heightened levels of well-being and fosters academic 'flow' by enabling students to be fully immersed in learning and effectively attain learning objectives.

However, students' well-being capacities are not acquired instantaneously but rather through an ongoing innovative and interactive learning process. A conducive learning milieu and meaningful learning experiences also wield influence over school well-being. As elucidated by Setiyo (2022), learning becomes more meaningful when it instils cognitive structures within students, thereby ensuring retention in memory over the long term. Nonetheless, as underscored by Cahyono (2021), attaining exemplary learning outcomes becomes unattainable if students solely rely on well-being within the school setting without concurrent development of cognitive abilities such as intelligence, interests, talents, or motivation. Consequently, educational institutions must devise a balanced curriculum that nurtures students' well-being and augments cognitive aspects such as intelligence, interests, talents, and motivation. This endeavour can be realised through integrating learning programs that foster students' personal growth and the utilisation of learning methodologies that bolster cognitive aspects within every learning activity.

Implementing outdoor learning-based PjBL has become a potent strategy for enhancing students' academic and social outcomes. The experimental group, which embraced the Outdoor-based PBL model, showcased superior performance compared to the control group, which adhered to conventional methods. Furthermore, students' affirmative responses across various dimensions, such as Having, Loving, Health Status, and Being, underscore the positive influence of PjBL on School Well-Being. Teachers play a pivotal role in enhancing subjective well-being, particularly concerning school satisfaction. Positive perceptions of social support from teachers correlate with heightened satisfaction levels among students at school. Factors external to the classroom environment, such as cultural background encompassing values, beliefs, and learning habits, also notably influence students' comfort and well-being (Rachmah, 2018). Ensuring students' happiness, well-being, and engagement in learning necessitates robust support from educational institutions. This support entails providing adequate facilities, delivering high-quality teaching, maintaining teacher motivation, and fostering a supportive social environment. Consequently, schools must bolster student learning motivation by employing appropriate strategies that positively impact student learning outcomes.

Conclusion

Based on the research findings, outdoor-based PjBL in elementary schools significantly impacts student learning outcomes and school well-being. The analysis revealed a substantial difference between the PjBL and control groups ($F=292.588$, $p < 0.001$). Notably, the PjBL group consistently outperformed the control group across all aspects of School Well-Being, encompassing Having, Loving, Health Status, and Being. Furthermore, the N-Gain score affirmed this difference, with the PjBL group achieving an 83% increase (high category) compared to the control group's 62% (medium category). These results underline the pivotal role of outdoor-based PjBL in enhancing both academic achievement and school welfare at the elementary school level.

For future research endeavours, broadening the sample pool to encompass a diverse range of student characteristics and school backgrounds is advisable. This would facilitate a deeper understanding of the effectiveness of outdoor-based PjBL across various educational contexts. Additionally, exploring the inhibiting and supporting factors in implementing PjBL and assessing its long-term impact can provide valuable insights into its efficacy. Such comprehensive analyses will contribute to a more nuanced understanding of the effectiveness and potential challenges associated with outdoor-based PjBL in elementary education.

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