

Impact of training methods and anxieties of students on their mastery of backstroke swimming skills

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Published online: December 25, 2022

(Accepted for publication December 15, 2022)

DOI:10.7752/jpes.2022.12397

Abstract:

This study investigated the impacts of different training methods (i.e., full training, partial training) and anxieties (i.e., high and low) of elementary school students on their mastery of backstroke swimming skills. This study was conducted as an extracurricular activity in the Islamic elementary school of Al-Azhar Kelapa Gading, North Jakarta. Materials and methods. The research design was level 2×2 involving 36 elementary school students (as research participants). The data were analyzed using two-way ANOVA and then used the Tukey test with a significance level of $\alpha = 0.05$. Results. 1) The students' value of the backstroke swimming skill in the partial training (A1) was higher than their value for the full training (A2). 2) There was a difference between the partial training (A) and anxiety (B) regarding the backstroke swimming skills of the elementary school students. 3) The students' value for the backstroke swimming skill from partial training with high anxiety (A1B1) were higher than the value from the full training with high anxiety (A2B1) in this extracurricular activity in the Islamic elementary school of Al-Azhar Kelapa Gading, North Jakarta. 4) The value for students' backstroke swimming skills from the partial training for low anxiety (A1B2) was lower than the value from the full training with low anxiety (A2B2). better than the partial training for improving elementary school students' mastery of backstroke swimming skills. Conclusions. The research implications and suggestions are as follows. In this case, the application of the partial training method shows a better effect than the full training. However, for students with low anxiety, the application of the full training

Key Words: full training, anxiety, backstroke swimming skills

Introduction

Physical education is a part of national education. The main purpose of physical education should be harmonious with national education (Syafei et al., 2020). Physical education at schools is regarded as a tool of education that plays a crucial role for attaining all learning goals (Blynova, 2020). Physical education is one of the compulsory subjects in high schools and vocational schools (Ciampolini, 2020). Through physical education, student development, and physical growth, the development of a balanced attitude, mental, social, emotional and movement skills can be stimulated for students (Ozdamli & Asiksoy, 2016). Due to the importance of physical education in schools, it must be taught properly and correctly (Sindiani et al., 2017). Elementary school is a period of students' development and growth, and physical education is expected to stimulate these. To achieve this goal, the learning materials from the lowest to the highest level of physical education have been regulated in the curriculum (Mischenko, 2020). Physical education is designed to improve physical fitness, develop motor skills, knowledge, active living behavior, and sportsmanship through physical activities (Pahič et al., 2021). The learning experiences presented in physical education will help students know why humans can move and how to move safely, efficiently, and effectively (O'Keefe, 2021). One form of physical education that is safe, efficient and effective is swimming (Silva, 2020).

Learning to swim can be applied as a tool for individuals How is swimming related to the spiritual development. Physical development aims to form a good posture, including in anatomy and physiology via health and physical abilities involving speed, agility, endurance, strength, and flexibility. Swimming is a very popular water sport, especially for children of elementary school ages (Ehrenfeld, 2017) (Man et al., 2020). This sport is very beneficial for the growth and development of children, providing harmony between the development of brain intelligence and skills, and most importantly, it can help children have balanced physical growth (Chiat & Ying, 2012). In addition, generally, swimming is a water sport. It is important to master because it has various benefits, both from games, competitions, and even matters related to safety (Westerterp, 2013). Recently, there have been many incidents of students drowning during the learning process in the water at the

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school caused by the negligence of teachers in managing the class or the lack of students' skills in swimming (García-Ramos et al., 2015)(Zetou et al., 2014)

Thus, the best solution is to introduce swimming to students while providing them opportunities to do swimming activities. This is conducted by inserting swimming into the educational curriculum, starting from basic education to higher education (Grove et al., 2014).

These activities can be carried out through interaction between teachers and students during class hours and sports extracurricular activities that are available at schools. (de RONZI et al., 2021)For harmonizing the application of swimming learning to the expected goals, every teacher or coach who teaches swimming needs to have knowledge and swimming technique skills and understand the use of effective and efficient training methods (Collard et al., 2022; Mitchell et al., 2020)

Swimming is divided into several styles, including a) freestyle, b) backstroke, c) breaststroke, d) and butterfly (Pyne et al., 2014). The backstroke is one of the most practical swimming styles among other styles, especially for beginners, including elementary school students, because the backstroke is not too difficult. During the implementation of the backstroke, the position of a swimmer's face and mouth are free from water, which can hinder the learning process (Ganchar et al., 2022) The ability to master the backstroke technique is one of the most important goals of extracurricular activity programs that teachers and coach plan.

As practitioners in this field, researchers observe the actual conditions in which not all students are able to master the backstroke swimming technique. This problem occurs due to differences in students' abilities and mastery of the studied technique. Based on the problems, it is necessary to find the best solution related to understanding students' basic techniques so that their technical skills gradually improve. One study (Bompa & Buzzichelli, 2019) explained the methods often used in teaching sports, i.e., a) the partial training method, b) full training method, c) drill method, and d) problem-solving method.

The novelty of this study was to determine the correlation of psychological factors with the different forms of training methods in swimming, and the results can be used for athletic coaching training programs. The training methods teach sports movements that have different characteristics. The application of training methods is based on the type of skills being learned, which has elements of movement that are difficult or simple (Matzenbacher et al., 2014). Moreover, the students are also a crucial factor and must be considered in the application of the training method. An in-depth study is needed in both theory and practice through experimental research to obtain further results.

The low ability of student skills in the backstroke swimming technique (Silfies et al., 2015) needs to be explored to determine the factors that cause it, which range from a physical condition, technique mastery, and training methods, and these are not yet clearly known (Marani et al., 2020).

However, it is rare for a teacher or a trainer to create variations of learning or exercises adapted to the conditions and abilities of their students. A teacher or trainer should create learning variations adjusted to the students' conditions and abilities. In addition, teachers/trainers should pay attention to a series of ongoing learning processes, especially the learning process and skills training for beginners (Fehmi et al., 2014)If, under real conditions, a teacher or trainer has no opportunity to conduct the learning or training process due to the limited existing infrastructure, creativity of the teacher/trainer is needed so that each learning goal can be achieved. Realizing that it is very important for students to master the backstroke swimming technique skills (Vieira et al., 2017), it will be better if it is learned as early as possible.

Therefore, an investigation concerning teaching/training of backstroke swimming techniques easily and appropriately for elementary school students is needed (Prewitt et al., 2015). Thus, this study was conducted to examine the differences in the effects of different training methods (full training, partial training) and student anxiety levels towards mastery of backstroke swimming skills in elementary school students.

Material & methods

This study used the experimental method. It was implemented to investigate the effectiveness of the treatment methods. In addition, it was used to examine the effect of the independent variable on the dependent variable that was investigated or observed. In this case, the experiment investigates the cause-and-effect relationship (causal relationship) between two factors intentionally caused by researchers by eliminating hindered factors.

The variables in this study consisted of two independent variables: the type of training method and anxiety level. The training method is an active independent variable divided into two classifications, i.e., 1) partial training and 2) full training. Meanwhile, anxiety is the attribute-free variable and is divided into two classifications: high anxiety and low anxiety. The dependent variable in this study is the backstroke swimming skill.

The research design is a design of study applied to research being carried out. The research design implemented in this study was a treatment-by-level design. In simple terms, this research design is described as follows.

Table 1. Research design of the treatment-by-level 2×2

Training method (A)	Partial training (A ₁)	Full training (A ₂)
Anxiety (B)		
High Anxiety (B ₁)	A ₁ B ₁	A ₂ B ₁
Low Anxiety (B ₂)	A ₁ B ₂	A ₂ B ₂
Total	A ₁	A ₂

Description: A1: Partial Training, A2: Full Training, A1B1: Effect of Partial Training with High Anxiety, A1B2: Effect of Full Training with Low Anxiety A2B1: Effect of Partial Training with High Anxiety, A2B2: Effect of Full Training with Low Anxiety

Data Collection Technique

Backstroke Swimming Skills

a. Operational Definition

Backstroke swimming skills are carried out in five stages of assessment, namely: 1) body position, 2) movement of the legs, 3) movement of the arms, 4) breathing, and 5) movement of coordination. The participant performed a series of backstroke swimming motions aimed at measuring basic technical skills in backstroke swimming and was assessed based on the best score. The best scores from three judges were taken as the median score. The results were data from the high category High ability to swim the backstroke. However, the data from the low category were not used.

The implementation of the backstroke swimming skills test are described as follows:

- 1) Set a track in the swimming pool as a swimmer's path between the partial and full training groups.
- 2) Set the track limit with a distance of 2 m.
- 3) The skills tests were carried out in turns based on the predetermined groups.

Instrument of Anxiety

1. Operational Definition

Operationally, in this study, anxiety was measured using a range of scores. The instrument testing was conducted at SD Bhinneka Tunggal Ika, Tambora, West Jakarta, considering the characteristics of students who were similar to those from SD Islam Al-Azhar Kelapa Gading, North Jakarta as the research school. The next calculated value of r shows a value (rxy) of 0.886. Compared with r table = 0.282, the rxy value is greater with a sig value of $0.000 < 0.05$ (Valid), while the reliability value is $0.957 > 0.6$ (reliable). The preparation process of the questionnaire was begun by determining the aspects of anxiety, namely intrinsic and extrinsic anxiety. Intrinsic anxiety includes 1) feelings of fear, 2) doubts about one's abilities, and 3) feelings about a lack of exercise. Meanwhile, extrinsic anxiety consists of 1) the influence of the family, 2) the influence of the coach, and 2) the influence of the training environment.

In this study, anxiety was categorized into high anxiety and low anxiety. Anxiety level is expected to be associated with other variables to Does low anxiety or high anxiety improve the skills improve the backstroke swimming skills of extracurricular students at Al-Azhar Islamic Elementary School Kelapa Gading, North Jakarta.

Test implementation:

All students filled out a questionnaire by responding to 36 questions at the same time at the research location. The values consisted of five categories.

Type of test: Anxiety

Table 2. The questionnaire provided to the participants

Variable	Dimension	Indicators	Code	Question Item		Sum
				+	-	
Anxiety	Anxiety <i>Intrinsic</i>	Feelings of Fear	A1	1,3,5	2,4,6	6
		Hesitating about his abilities	A2	7,9,11	8,10,12	6
		Feelings of Lack of Exercise	A3	13,15,17	14,16,18	6
	<i>Extrinsic Anxiety</i>	Family Influence	B1	19,21,23	20,22,24	6
		Coach's Influence	B2	25,27,29	26,28,30	6
		The Influence of the Exercise Environment.	B3	31,33,35	32,34,36	6
Number of Statements						

Results

1. Testing Requirements Analysis

Testing requirements analysis is a requirement that must be met before the analysis of variance (ANOVA). Two conditions must be met before conducting the analysis of variance (ANOVA); the (1) normality test and (2) population variance homogeneity test. These were performed to test the normality of the data in this

study using the Lilliefors test and to test the homogeneity of the population variance using the Bartlett test both at a significance level of 0.05.

Table 3. Sample normality test results

Group	N	L_0	L_t	Conclusion
1	12	0,174	0,200	Normal
2	11	0,127	0,200	Normal
3	11	0,167	0,271	Normal
4	10	0,167	0,271	Normal
5	17	0,167	0,271	Normal
6	14	0,196	0,271	Normal

The results of the normality test for the entire research group show that the largest L_0 value of the entire treatment group is smaller than the L_t value; thus, the sample was from a normal distribution population.

Table 4. Sample homogeneity test results

Group	Variance	Combined Variance	X^2_h	X^2_t	Conclusion
1	1,22				
2	1,32	1,137	0,246	7.81	Homogeneous
3	1,00				
4	1,00				

The calculation results are shown in Table 4 the value of $2 = 0.246$, which is smaller than the value of $2t = 7.81$. $H_0: 12 = 22 = 32 = 42$ is accepted as the real level = 0.05. Conclusion: the four populations have the same large variance (homogeneous).

Hypothesis Testing

1. There would be a difference in the impact of partial training vs. full training on the elementary school students' mastery of backstroke swimming skills.

The calculation analysis (ANOVA) showed a significance level = 0.05, $F_0 = 149.33$, and $F_t = 4.11$. Thus, $F_0 > F_t$ means that H_0 is rejected. Overall, there was a significant difference in the effect of the partial method compared with the full training on the results of the elementary school student's mastery of backstroke swimming skills. The results are in line with the first research hypothesis that there is a difference in the effect of the partial method compared with the full training on the elementary school student's mastery of backstroke swimming skills.

2. There would be a difference interaction between the partial training and full training on the elementary school students' mastery of backstroke swimming skills.

Based on the results of the two-way 5, the comparison between the partial training and the full training on the elementary school students' mastery of backstroke swimming skills is presented in the table 5 below. The calculated value of interaction F_0 (FAB) = 12.19, and $F_t = 4.11$. This means that $F_0 > F_t$, so H_0 is rejected, and H_1 is accepted. Based on the description above, it can be assumed that there is a difference between the partial training and full training for the elementary school students' mastery of backstroke swimming skills. It is relevant to the second hypothesis that there is a difference between the partial training and full training in the elementary school students' mastery of backstroke swimming skills. The test results are presented in the table 5 below.

Table 5. The Tukey test calculation results for backstroke swimming skills at level = 0.05

Compared group pairs	λ_{count}	$Q_{table 0.05}$	Conclusion
P1 with P2	16.58	3.68	Significant
P3 with P4	19.20	3.72	Significant
P5 with P6	5.24	3.72	Significant

3. There would be a difference in the effect of partial training vs. full training on the backstroke swimming skills in elementary school students with high anxiety.

According to the recommendation of Gane V Glass, the calculation of the advanced analysis of variance with the Tukey test was applied to compare the high anxiety group for the two training methods. The calculations of the difference in the backstroke swimming skills for the high-anxiety group trained with partial training vs. the full training are provided in the Appendix. The results of the Tukey test calculation are presented in the following table.

Table 6. Tukey test calculation results

No	Compared group pairs	Q_{count}	$Q_{table 0.05}$	Note
1	P1 with P2	16.58	3.68	Significant

According to Table 4, the price of $Q_{count} (Q_h) = 16.58$ is higher than $Q_{table} = 3.68$ or $Q_{count} > Q_{table}$ at a significance level of 0.05. Thus, the null hypothesis (H_0) is rejected, and the alternative hypothesis (H_1) is

accepted. Thus, backstroke swimming skills in the high anxiety group who were trained with partial training ($\bar{X} = 17.00$ and $s = 1.22$) were higher than the group trained via full training ($\bar{X} = 13.33$ and $s = 1, 32$). Therefore, the third hypothesis was that there would be a difference between partial training and full training in terms of backstroke swimming skills for students who have anxiety.

4. There was no difference between the partial training and full training methods on the backstroke swimming skills for elementary school students that had low anxiety.

The calculation of the advanced analysis of variance with the Tukey test was performed to compare the low anxiety group. The calculations of the difference in the backstroke swimming skills in those trained via partial training compared with those training via the full training method are described in the Appendix. The results of the Tukey test calculation are shown in the following table.

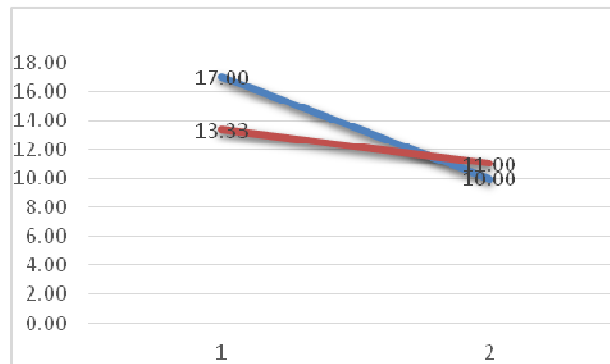
Table 7. Tukey test calculation results

No	Compared group pair	Q_{count}	$Q_{table 0.05}$	Result
1	P5 with P6	5.24	3.72	not significant

The low anxiety group with partial training compared to the low anxiety group with full training showed that $Q_{count} (Q_h) = 5.24$, which is higher than $Q_{table} = 3.72$ or $Q_{count} > Q_{table}$. This result is the reason to accept H_0 . Thus, there was a difference between the partial and full training for those with low anxiety in terms of backstroke swimming skills.

Based on the results, the average score for the backstroke swimming skills of the high anxiety group trained with partial training was 17.00, and the low anxiety group had an average score of 10.00. The average score for the backstroke swimming skills in the high anxiety group was 13.33, and in the low anxiety group, it was 11.00.

Thus, the third research hypothesis that there would be a difference between the partial and full training methods on the backstroke swimming skills are described in the following figure.



Information:

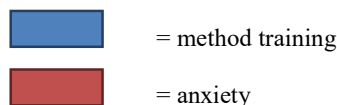


Figure 1. Comparison of partial training vs. full training on backstroke swimming skills

Discussions

Hypotheses 1, 2, and 3 were tested, and there were significant differences. In contrast, for the fourth hypothesis, there was no statistically significant difference. On average, for the partial training method, the score was higher for backstroke swimming skills for the group who had anxiety (Campa, 2019). Thus, the two different training methods showed different effects on the backstroke swimming skills. However, the fourth hypothesis could not be verified because the collected data did not support it. It is still a presumption because it cannot be proven empirically (Petrie & lisahunter, 2011). Thus, examining the various possibilities for the unproved hypothesis is necessary. The possibilities are discussed as follows. (1) The short training time is possibly one of the reasons for the fourth unproved hypothesis. (2) The limited infrastructure for swimming training as a part of extracurricular activities makes the training ineffective. (3) Some students may have performed other sports activities outside of this study, although before the training, they had been informed not to perform other sports activities during the research period. (4) Physical factors may affect the low physical components of elementary school students. (5) Students' learning interest is an element of psychology suspected to have influenced this study. In this case, learning interest is one of the stimulants for a person to perform a

particular activity. If someone is interested in doing an activity, he will be more serious about doing that activity.

(Hlukhov et al., 2022) argued that under these conditions, a teacher/trainer should be able to evaluate all the factors affecting students' skills, derived both from factors related to the teacher/trainer and from the students themselves. In general, elementary school students who have not mastered the backstroke swimming technique feel that they are not ready and do not have adequate skills, so they also have difficulty performing the backstroke swimming technique (Ganchar et al., 2022) This condition is usually experienced by students who do not enjoy sports activities. Moreover, lack of infrastructure, less effective learning methods, and psychological factors, especially students' anxiety levels, affect their low backstroke swimming skills (Zetou et al., 2014)

In summary, the findings show that implementation of the partial training method had a better effect than the full training. Elementary school students who have high anxiety should choose the partial method if they want to improve their mastery of backstroke swimming skills (López-Carril et al., 2020). Meanwhile, the elementary school students with low anxiety, the two training methods (partial and full training) can be applied to improve their mastery of backstroke swimming skills (Samsudin et al., 2021). However, it is better to train the students using the full training because of the difference in average.

Conclusions

Based on the results of data analysis Hypotheses 1, 2, and 3 were tested, and there were significant differences. In contrast, for the fourth hypothesis, there is no statistically significant difference. the testing of the research hypotheses, and the results of the research discussions that were obtained, our conclusions, the research implications, and suggestions are explained as follows. There was a difference between implementation of the partial training method and the full training method for improving elementary school students' mastery of backstroke swimming skills, and there was a difference between the partial method and the full training on elementary school students' mastery of backstroke swimming skills. For students with high anxiety, implementing the partial method improved elementary school students' mastery of backstroke swimming skills. In this case, application of the partial training method showed a better effect than the full training method. However, for students with low anxiety, the application of full training was better than partial training at improving their mastery of backstroke swimming skills.

Thus, examining the various possibilities for the unproved hypothesis is necessary. The possibilities are discussed as follows. (1) The short training time is possibly one of the reasons for the fourth unproved hypothesis. (2) The limited infrastructure for swimming training as a part of extracurricular activities makes the training ineffective. (3) Some students may have performed other sports activities outside of this study, (4) Physical factors may affect the low physical components of elementary school students. (5) Students' learning interest is an element of psychology suspected to have influenced this study. Suggestions for further research and recommendations for future research, namely the selection of more samples, age criteria and class Athletes in sampling, namely professionals and for scientific progress in swimming sports coaching

Acknowledgements

The authors would like to acknowledge all volunteers in this study. The authors also thank the Dean of the Faculty of Sport Science, State University of Jakarta, Indonesia, and staff for their support throughout the course of this study. Special thanks are also given to all doctors in Physical Education at Universitas Negeri Jakarta and the authors would like to thank Falcon Scientific Editing (<https://falconediting.com>) for proofreading the English language in this paper.

Conflicts of interest

The authors declare no conflicts of interest.

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