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The effect of modification of movement in training on students' swimming competence
El efecto de la modificación del movimiento en el entrenamiento sobre la competencia de natación de los estudiantes

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Abstract The purpose of the research was to determine the effect of movement modification in training on students' swimming competence. The research method used an experimental method with One Group Pre-test-Post-test Design. The population consisted of 71 students. The sample was taken as many as 10 students with purposive sampling technique. The tool used to collect data was the Swimming Competence Questionnaire (SCQ). The data collection technique consists of three parts: First, the initial test with SCQ; Second, treatment with movement modification; and third, the final test with SCQ. The treatment lasted for 16 training sessions, one training session per week, and 120 minutes per session. The training program consisted of warm-up, exercise, and cool-down. Data analysis techniques used, namely normality test, homogeneity test and hypothesis test. Based on the Paired Samples Test output, the Sig. (2-tailed) value = 0.000 was obtained, which is smaller than a = 0.05. Thus, Ho is rejected and Ha is accepted. The conclusion of this study, the provision of modifications in training can significantly affect the swimming competence of students.
Keywords Modification of movement, Training, Swimming Competence.

Resumen. El propósito de la investigación fue determinar el efecto de la modificación del movimiento en el entrenamiento sobre la competencia de natación de los estudiantes. El método de investigación utilizó un método experimental con Diseño Pre-test-Post-test de un solo grupo. La población estuvo conformada por 71 estudiantes. La muestra se tomó hasta 10 estudiantes con técnica de muestreo intencional. La herramienta utilizada para la recogida de datos fue el Swimming Competence Questionnaire (SCQ). La técnica de recolección de datos consta de tres partes: Primero, la prueba inicial con SCQ; En segundo lugar, tratamiento con modificación del movimiento; y tercero, la prueba final con SCQ. El tratamiento tuvo una duración de 16 sesiones de entrenamiento, una sesión de entrenamiento por semana y 120 minutos por sesión. El programa de entrenamiento consistió en calentamiento, ejercicio y vuelta a la calma. Técnicas de análisis de datos utilizadas, a saber, prueba de normalidad, prueba de homogeneidad y prueba de hipótesis. Según el resultado de la prueba de muestras pareadas, la Sig. Se obtuvo un valor (de dos colas) = 0,000, que es menor que a = 0,05. Por tanto, se rechaza Ho y se acepta Ha. La conclusión de este estudio es que la provisión de modificaciones en el entrenamiento puede afectar significativamente la competencia en natación de los estudiantes.
Palabras clave: Modificación del movimiento, Entrenamiento, Competencia en Natación.

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Introduction

Physical activity is every movement of body produced by skeletal muscles that requires energy expenditure (Bull et al., 2020; Kristiyanto et al., 2020). The definition is broad, so that almost all kinds of physical activity includes active playing, active transport (walking or bicycling), physical education, sports, and exercises and other purposive exercises (Woods et al., 2018; Nasrulloh et al., 2022). For children and teenagers, physical activity have benefits for health such as: Enhancing physical fitness (cardiorespiratory and muscles fitness), cardiometabolic health (blood pressure, dislipidemia, glucose, and insulins resistance) bone health, cognitive results (academic performance, executive function), mental health (decrease depression symptoms) and decreasing adiposity (World Health Organization, 2020; Yudhistira et al., 2021).

Swimming is one of the most popular physical activities of extracurricular in Australia (Australian Sports Commission, 2018), England (Pontefract, 2023), US (Wallace et al., 2022), and Indonesia. In the past, swimming was only defined as an act of moving the body in the water - first, as the act of survival and then as a competition (Escalante & Saavedra, 2012). Swimming is a sport which is done by keeping on moving the legs and hands on and on to reach certain distance in the water (Eskiyecek, 2020). Swimming ability is important to survive in emergency situations in the water, as a potential of survival (Pilgaard et al., 2020).

Swimming is a kind of sport that gives benefits for health (Oja et al., 2015), cardiorespiratory fitness and body composition (Derwin King Chung Chan et al., 2020), and better muscles strength (Salafi et al., 2022). Aside from the benefits mentioned, swimming is a and activity that relates to drowning (Wolf et al., 2009). Drowning is a process when someone has a problem with respiration caused by submersion or immersion in the water (van Beeck et al., 2005). The process of drowning begins with breathing problems, because a person's airway is below the surface of the liquid (submersion) or the water only covers part of it (Szpilman et al., 2012). Drowning can be fatal or non-fatal (Listyarini et al., 2021). Drowning, road traffic and falls are the leading causes of death from unintentional fatal injuries (Sukendro et al., 2021). The main risk factors include lack of barriers and supervision for children, poor swimming skills, low awareness of the dangers of water, alcohol consumption, transportation on water, and flood disasters

(Ilham et al., 2021).

Drowning is a major public health problem, but it is often overlooked (van Beeck et al., 2005). Globally, in 2019 an estimated 236,000 people died from drowning (Sutapa et al., 2021), thus making drowning a major public of health problem worldwide (Saifu et al., 2021). Low and middle income countries account for more than 90% of deaths from accidental drowning, more than half of the world's drowning cases occur in the Western Pacific and South-East Asia (Nopembri et al., 2022).

Drowning is a major cause of death of children and teenagers. Globally, the highest drowning rate is among children aged 1–4 years, followed by children aged 5–9 years (Hastuti, 2021). In the Southeast Asia Regions, the death rate due to drowning is still much higher than the global average for both men and women in each age group (Hardianto et al., 2022). Figure 1 shows that drowning as a cause of death ranks second in the 10–14 year age group, third in the 5–9 year age group, sixth in the 15–24 year age group, and seventh in the under 5 year age group.

Research also shows an alarming drowning load. In Purworejo, drowning is the second leading cause of death after transportation-related injuries. National statistics from 2014–2018 SAR operations report 31,390 people were involved in drowning events, including survivors (90%), dead (4.7%) and missing (5.4%). Data reported from the sample registration system in 2014 revealed that accidental drowning in Indonesia is the leading cause of death among the younger population. The fifth leading cause of death occurs in children aged 1-4 years, the third rank in children aged 5-14 years in Indonesia (Pratama et al., 2022).

Developing an adequate level of water competence is very important for children (D'Hondt et al., 2021). From an early age onwards, all children should be given the opportunity to learn and master aquatic skills, with a focus on survival (Utami et al., 2023). Being competent in water, including having the necessary physical or motor, cognitive and affective abilities can be beneficial for water safety in children in efforts to prevent drowning (Stallman et al., 2017; Taylor et al., 2020).

School-based training that provides a general foundation for water safety (Wilks et al., 2017). School is an educational institution designed to provide a learning space and learning environment for teaching students under the direction of the teacher (Boruah, 2020). Schools equip students to acquire knowledge, abilities and attitudes in accordance with the goals and principles of the education system (Turkkahraman, 2015), through three curricular channels namely intracurricular, co curricular and extracurricular.

Inherently, that the goal of prevention is to limit the risk of exposure by creating a well-informed public about the risk of drowning (Katchmarchi et al., 2017). Reducing the number of deaths related to drowning will contribute to reducing the number of premature deaths (Willcox-Pidgeon et al., 2020). Drowning can be prevented through implementing six interventions (including teaching children swimming skills and water safety) and four cross-sectoral implementation strategies (Adji et al., 2022).

Breathing control is key to learning to swim. Control breathing is one of the proposed aquatic skills related to drowning prevention (Nugroho et al., 2021). Control breathing is considered very important of all survival competencies and basic skills for further learning (Nasrulloh et al., 2020). In addition, breath control is most often placed first in any teaching development (Kogoya et al., 2023).

A study has reported that a child being able to swim 25 m without stopping in front does not automatically give someone the ability to swim behind, turn, roll over, stop and rest or jump and dive into the water (Nugroho et al., 2022). If an emergency requires a person to swim on their back or stop and rest to gather their senses, catch their breath, calm down, and redirect themselves (Trisnadi et al., 2023). Any attempt to stop and rest requires much more energy than continuing to swim.

In addition, children who are able to swim 10 to 15 m but who do so comfortably and skillfully float in deep water, are able to swim 10 m, rest, another 10 m, rest, and even another 10 m, for a total of 30 m (Amran et al., 2023). They are superior to children who can only swim 25m with great difficulty and cannot stop and rest. Swimming with your head held high has not yet learned optimal breathing, but a skilled person can do both. Heart rate, oxygen uptake, and lactate levels increase when swimming the breaststroke with the head constantly above the surface compared to swimming with a more efficient breathing pattern involving immersion of the face (Jufrianis et al., 2021).

Effective breathing is the key to economic movement. Effective breathing is defined as: 1) Comfortable air exchange, when needed or desired and does not add to the expenditure of foreign energy; 2) Breathing movements that are spatially and temporally integrated which allow inhalation and expiration without interfering with other movements; 3) Techniques that in no way compromise optimal body position; and 4) Techniques that meet the needs of the task at hand, the people involved, and the environment (Sutapa et al., 2020).

Previous reviews Yuniana et al., (2023) have recommended regarding the extent to which effective breathing is emphasized or de-emphasized in teaching, exploring the consequences of additional attention or lack of effective breathing during teaching or learning, exploring possible stroke modifications to improve head swimming, and exploring the nuances of effective breathing in open water, surfing, while dressing, or in other environmental tasks/situations. Based on the problems found, the authors feel the need to complement or fill in the gaps by conducting research that aims to investigate the effect of modification of movement in training on students' swimming competence.

Methods

The research used an experimental method with a One Group Pretest-Posttest Design, namely a research design that contained a pretest before being given treatment and a

posttest after being given treatment. Thus it can be known more accurately, because it can be compared with those held before being given treatment. The population consists of all 71 students of the 2021/2022 Sports Education Study Program. The sample size used was 10 people. The sampling technique used is purposive sampling.

The research instrument used the swimming competence questionnaire (SCQ) (Derwin K.C. Chan et al., 2020). The data collection technique consists of three parts: first, the initial test using the SCQ; Second, giving treatment using movement modification; Third, the final test using the SCQ instrument. The treatment was carried out for 16 exercises. Treatment was given once per week with a duration of 120 minutes per exercise. Each training session consists of three components, including: warm-up, practice and cool-down. Third, the final test uses the same instrument as the initial test, namely the SCQ. Data analysis techniques used include: normality test, homogeneity test, and hypothetical test.

Results

The data normality test used in this study used the Shapiro Wilk, because the research sample used was less than 50 people. The results of the data normality test can be seen in table 1.

Based on the table above, the significance value in the Shapiro-Wilk test is 0.512 and 0.193 is greater than 0.05. Thus, it can be concluded that the data is normally distributed.

After the normality test, it is continued with a homogeneity test by looking at the output level statistics which of course use the SPSS application. The homogeneity test results can be seen in table 2.

Table 1.
Results of normality test

	Shapiro-Wilk		
	Statistic	df	Sig.
Pre-test	.936	10	.512
Post-test	.895	10	.193

Table 2.
Results of homogeneity test

Levene Statistic	df1	df2	Sig.
3.360	1	18	.083

Based on the table above, the significance value in the Levene Statistical test obtained a number of 0.083 greater than 0.05. In conclusion, that the data is normal.

Meanwhile, to test the hypothesis in this study is to use Paired Samples Test. The results of hypothesis testing can be seen in table 3.

Based on the table, the Sig.(2-tailed) = 0.000, value is obtained, meaning that it is smaller than $\alpha = 0.05$. Thus, H_o is rejected and H_a is accepted. The results of hypothesis test show that there is an effect of modification of movement in training on students' swimming competence

Table 3.
Results of hypothesis test

	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference		t	df	Sig. (2-tailed)
				Lower	Upper			
Pre - Post	-19.20	9.27	2.93	-25.83	-12.56	-6.54	9	.00

Discussion

Based on the results of the analysis, the value of Sig.(2-tailed) = 0.000 is obtained, which is less than $\alpha = 0,05$, That is, H_o is rejected and H_a is accepted. The results of the hypothesis test show that there is an effect of movement modification in training on students' swimming skills. Through modification of movements in swimming exercises, aquatic skills can be trained, in which aquatic skills are an important component in developing physical literacy (van Duijn et al., 2021). Increasing involvement in learning aquatic skills can help save lives in an emergency situation. Nasrulloh et al., (2021) said that varying competence in water is as important as practicing technical skills, and this competency can prevent someone from drowning. Students who have adequate aquatic skills can make the right decisions and take the right actions in situations where there is a risk of drowning (Petrass & Blitvich, 2014). Students can swim in a supine or prone position, dive on the surface of the water or dive to retrieve objects, rest (control their breath) while looking at the situation around them, and are able to swim again to return to their place of origin, to cross, or even to reach a certain distance.

The research has several limitations, including: First, the authors did not test the validity and reliability of the instruments used. Considering that the instrument was previously used for elementary schools. It is also possible to make adjustments or modifications to the instrument, as the treatment given is different from previous studies. Second, this study was conducted on a small sample. Therefore, the authors suggest further research using a larger sample. Third, the sample used in the research were college students. Further research is expected to use a different sample (high school, junior high school, and elementary school studentConclusion

Based on the results of the research, it can be concluded that there is an effect of modification of movement in training on student swimming competence. The author suggests developing special instruments related to swimming competence by incorporating aspects of survival swimming. It is also possible for students to be given a swimming program to increase endurance, at least they must have certain minimum endurance requirements. The authors recommend to anyone that just being able to win is not enough. Therefore, some modifications of

swimming movements must be mastered by students. The author also recommends to coaches that swimming movement modifications are included in the training program.

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ЦИФРОВИХ МЕДІА ТА ФІЗИЧНОЇ АКТИВНОСТІ З ФІЗИЧНОЮ ПІДГОТОВЛЕНІСТЮ УЧНІВ 4-ГО ТА 5-ГО КЛАСІВ ПОЧАТКОВОЇ ШКОЛИ. *Theory and Methods of the Physical Education*, *21*(3), 281-287.

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