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Direct and indirect assistance and motivation: How do they affect learning handstand skills?

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ABSTRACT

Background Problems: The level of skills at this time is optimally needed, especially for students because it can be a selling point for them, but the skills of these students are still very underestimated because there has been no innovation to find out the skill level of current students. **Research Objectives**: The purpose of this research is to determine the effect of direct and indirect assistance and learning motivation on handstand skills. **Methods**: This research model is a quasi-experiment with a factorial design with 2 x 2 levels. The population of this study was 106 people, and the sample size was 40 people using the ordinally mathematical pairing technique. Collecting data on learning motivation using a questionnaire and handstand skills using a handstand skills test. Data were analysed using a two-way ANOVA at a significance level of α = 0.05 and the Shapiro-Wilk Sig normality test > 0.05. Furthermore, because no interaction was found between assistance with motivation and handstand skills, the Tukey test was not carried out. **Findings and Results**: The results of the data analysis show: (i) Overall, there is no difference in the influence of assisted handstand skills; (ii) There is no interaction between assistance and learning motivation on handstand skills; and (iii) Directly assisted handstand skills are no better than indirect assistance in learning. high learning motivation group, (iv) Indirect assistance handstand skills were better compared to direct assistance in the low learning motivation group. **Conclusion**: These findings are important because they provide information about handstand skills in the form of assistance that may be useful for teachers and students in improving handstand skills. This research shows that there is no significant difference between direct and indirect assistance in improving handstand skills. The recommendation for future research is to expand the sample and consider individual factors among students.

Keywords: Handstand skills; motivation; assistance

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INTRODUCTION

Sports play an important role in the life of every individual, not only as an activity to improve health and physical fitness but also as a means of education and competition (Sari, 2018). Its role has grown from just an activity to fill leisure time to being multifunctional, covering aspects of achievement, economics, and politics.

In Indonesia, sports are now seen as an industry with high potential for creating economic value (Widianingsih et al., 2023). In the national context, sports in Indonesia have become an integral part of the country's development, as outlined in the State Direction Outline. Thus, sports in Indonesia are not only considered as physical activities but also as a tool to shape and develop national character and identity. Indonesia's human development emphasises the balance between physical, intellectual, mental, and spiritual aspects. In this context, sports achievements play an important role in enhancing the sense of pride of the nation and strengthening national identity (Shibli et al., 2021).

Sport has become an integral part of every individual's life, providing benefits that extend from aspects of health to education and achievement (Hermawansyah et al., 2021; Piñeiro-Cossio etal., 2021; Sulz etal., 2023). Now, sports are not just leisure activities but a trend that permeates various walks of life, from children to the elderly (Dai & Menhas, 2020; Pröbstl-Haider et al., 2021; Ridwan et al., 2022). In the context of human resource development, sports are considered one of the strategic pillars to improve human quality (Ilham etal., 2023; Marquez et al., 2020). According to sports coaching, it not only aims to improve physical health but also includes mental, spiritual, and character and personality formation aspects accompanied by discipline and high sportsmanship (Bissett et al., 2020; Muhtar et al., 2020; Rato Barrio et al., 2021). Increased sporting achievement is considered a tool to evoke a sense of pride in individuals and countries (Daniels & Tichaawa, 2021; Gordon et al., 2021; Lu, 2021; Shibli et al., 2021). Therefore, sport is not only a physical necessity but also has an impact on intellectual, mental, spiritual, and national development. Of the various types of sports that exist, gymnastics stands out as one form that is able to embrace this potential (Hidayat & Sujarwo, 2022).

Gymnastics is a body exercise that is arranged systematically with the aim of increasing physical fitness, developing skills, and forming a harmonious person (Kokarev et al., 2023; Zulbahri et al., 2022). The International Gymnastics Federation (FIG) divides gymnastics into various classifications such as gymnastics, tumbling, rhythmic, trampoline, and others (Albright et al., 2023; Patel et al., 2021). Gymnastics is not only a competition event but has also been integrated into the school curriculum as part of physical education and health subjects (Bento-Soares & Schiavon, 2023; Bortoleto et al., 2023; McVeigh & Waring, 2023). However, in the midst of various gymnastic movements, there is one basic skill that is considered fundamental, namely handstand (Arnista et al., 2020; Mizutori et al., 2021). In addition to elementary to high school levels, handstands are also studied at the lecture level, especially for sports students (Lubis et al., 2023; Morsalfard et al., 2023). Handstands require several components of physical condition such as strength, coordination, and flexibility (Gasparetto et al., 2022; Salse-Batán et al., 2022). In addition, fear also complicates handstand practice (Kilipper et al., 2023). So regular practice and the right learning method are needed to increase motivation for overcoming these difficulties.

This difficulty affects not only students in schools but also educators and coaches who must master and teach the skill (Pitnawati et al., 2023). Without a clear method, learning the handstand becomes more difficult (Ávalos-Ramos & Ruiz, 2022). This demands innovation in teaching methods and media in the gymnastics curriculum to provide clear guidance from basic to advanced levels. Handstands are important in gymnastics, so they need further research and development. This includes detailed training materials, the use of technology, and training methods that are adaptive to the different needs of students and aspiring coaches. Newell and Irwin (2022) identified three barriers to learning handstand: individual (body structure, strength, coordination, balance, and fear), task (rules, goals, and aids), and environment (training site conditions, social support, and cultural aspects). These three aspects should be considered when researching the solution to handstand learning problems.

Previous research has addressed the development of direct and indirect assistance approaches in gymnastics. For example, the study by Pitnawati et al. (2023) used the Jigsaw method and Android-based digital design for gymnastics materials. Then, the study by Zulbahri et al. (2022) applied direct and indirect assistance to front-roll gymnastics material through learning media. Both studies used direct and indirect assistance approaches. However, no research has explored the psychological aspects of motivation in learning gymnastics, particularly in the context of handstand material. This approach aims to not only identify the right method to teach correct handstand technique but also help students develop confidence and adaptability when facing challenges in learning gymnastics. By integrating motivational strategies, this study seeks to create a

more holistic and engaging learning experience. This study aims to determine the effect of direct and indirect assistance, as well as learning motivation, on handstand skills.

METHOD

This research refers to quantitative research. We can interpret quantitative methods as positivist-based research methods that investigate specific populations or samples, gather data using research instruments, and conduct quantitative or statistical data analysis to test predetermined hypotheses. Researchers use quasi-experimental or non-labour research to determine whether the independent variable influences the dependent variable under controlled conditions. A quasi-experiment aims to obtain information, which is an estimate of the collected information that can be obtained through experiments without using a laboratory. In this type of research, you are faced with circumstances that make it impossible to control and/or manipulate all relevant variables. There are three variables proposed here, namely, independent variables consisting of direct assistance (A1) and indirect assistance (A2). The intervening variable is learning motivation (B), and the dependent variable is students' handstand ability (Y) at the Faculty of Sport Science at Universitas Negeri Padang. Direct assistance in handstand teaching involves direct touch or physical support from the instructor to help students maintain balance. Meanwhile, indirect assistance involves verbal guidance or tutoring without direct physical interaction, encouraging students to develop balance independently. Table 1 outlines the steps and training programme for direct assistance in learning handstand material.

Table 1. Stages of Conducting Direct Help Experiments

1.	People prepare in front of the mat by raising both hands straight up, while lifting one of the legs (dominantly) forward as a starting stance.
2.	At the same time, helpers put themselves next to people.
3.	People try to put both hands on the floor and simultaneously swing one of the legs (dominant). The helper, at the same time, holds the leg moved by the person and proceeds to raise the next leg.
4.	Both legs are pressed together until they reach the handstand stance.

Table 2. Handstand Learning Training Program Through Direct Assistance

Exercise	Repetitions						Sets
	1-3 Weeks	4-6 Weeks	7-9 Weeks	10-12 Weeks	13-15 Weeks	16-18 Weeks	
Push up	10-15 Sec	20-25 Sec	30-35 Sec	40-45 Sec	50-55 Sec	60-65 Sec	3
Plank	10-15 Sec	20-25 Sec	30-35 Sec	40-45 Sec	50-55 Sec	60-65 Sec	3
Sit up	10-15 Sec	20-25 Sec	30-35 Sec	40-45 Sec	50-55 Sec	60-65 Sec	3
Split	10-15 Sec	20-25 Sec	30-35 Sec	40-45 Sec	50-55 Sec	60-65 Sec	3
Upper and Lower Back up	10-15 Sec	20-25 Sec	30-35 Sec	40-45 Sec	50-55 Sec	60-65 Sec	3
Walk Bounce By Hand				3 Sets/Day			
Foot Swinging on the Wall				3 Sets/Day			
Hand and Foot Swing Movement				3 Sets/Day			

This population encompasses all students who enrol in the basic gymnastics course in the major department in 2023, with as many as 106 individuals receiving coaching. A learning motivation questionnaire serves as the first step in obtaining the required sample, which is a representation of the population. A sample size of 40 people is required. We distributed this questionnaire to all students enrolled in basic gymnastics courses during the July-December 2023 semester. The instrument study employs two tools: a questionnaire to gauge motivation levelsand a handstand skill test to assess students' initial and final handstand abilities. There are two tools used. The first is a questionnaire for determining motivation level, with a validity level of 0.878 and a reliability level of 0.435. Then, the handstand skill test is used to determine the the handstand skill test then determines the initial and final ability of students to perform handstands. questionnaire, a motivation study, and a test of handstand skills. The results of the gradual data collection analysis are consistent with the research

objectives. To analyse the data in this research, a factorial with level 2 x 2 design is used if an interaction between assistance is found to be direct and helpful. We do notpursue a direct motivation study using the Tukey Test. Before the data is processed using the Anava analysis technique, the Anova requirements test is first carried out, namely the normality test and the homogeneity of variance test with a significance level of α = 0.05.

RESULTS AND DISCUSSION

This research obtained average handstand skill results for groups A1 and A2 of 4.55 and 5.02, respectively. For groups B1 and B2, the averages are 4.60 and 4.97. The average handstand skill results for groups A1B1 and A2B1 were 4.39 and 4.81, respectively. Furthermore, the averages for groups A1B2 and A2B2 are 4.70 and 5.23. This shows that the average for the A2B2 group is better than the other treatment groups (see Table 3 and Figure 1). Table 4 and Figure 2 also show that the normality and homogeneity tests of the data are normally and homogeneously distributed (p > 0.05).

Table 3. Handstand Skill Results for Each Treatment Group

Group	N	Minimal	Maxsimal	M ± SD
A1	20	3.0	7.0	4.55 ± 1.06
A2	20	3.1	6.8	5.02 ± 0.97
B1	20	3.0	6.0	4.60 ± 0.99
B2	20	3.0	7.0	4.97 ± 1.07
A1B1	10	3.0	6.0	4.39 ± 1.05
A2B1	10	3.4	6.0	4.81 ± 0.93
A1B2	10	3.0	7.0	4.70 ± 1.11
A2B2	10	3.1	6.8	5.23 ± 1.02

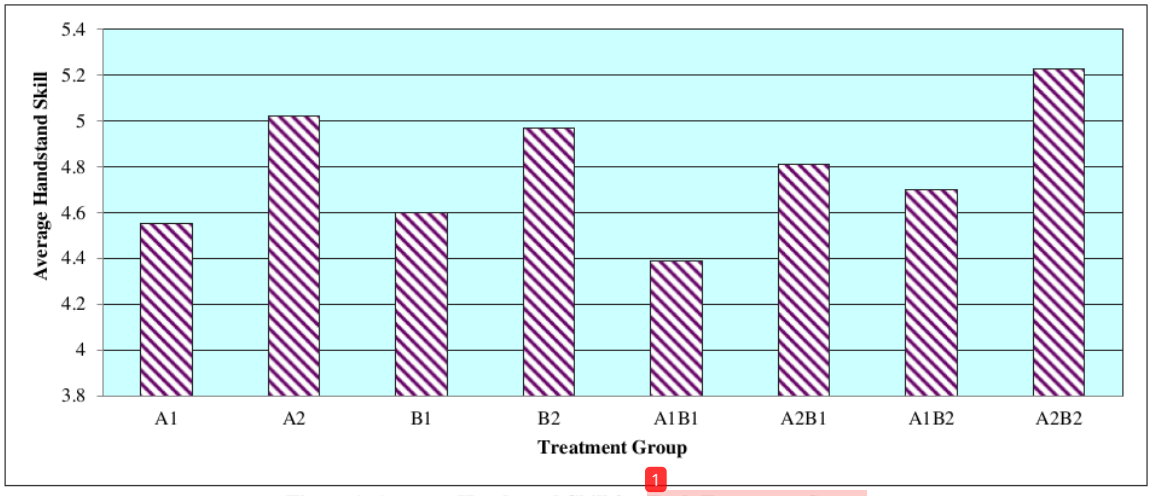

Figure 1. Average Handstand Skill for Each Treatment Group

Table 4. Normality Test and Homogeneity Test

Normality Test						Homogeneity Test		
Kolmogorov-Smirnov			*Shapiro-Wilk*			Levene Statistics		
Statistics	*df*	*P*	Statistics	*df*	*P*	*df1*	*df2*	*P*
0.102	40	0.200	0.987	40	0.908	3	36	0.978

Note: Data is normally distributed and homogeneous (P > 0.05)

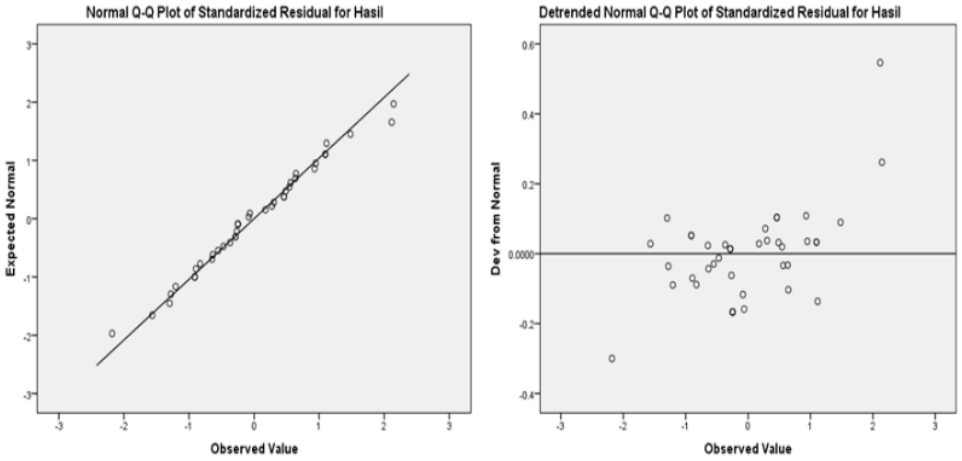

Figure 2. a) Normality plot graph, b) Normality plot graph which has decreased

Table 5 below presents the result of the two-way Anova test. The table shows that the motor ability results for groups A1 and A2 ($p < 0.05$) and B1 and B2 ($p < 0.05$) are significantly different. Figure 3 shows that there is a significant interaction between groups A and B ($p < 0.05$). To find out which treatment group had a better effect on motor skills, further tests were carried out using the Tukey test.

Table 5. Two-way Factorial ANOVA

Source	Type III Sum of Squares	df	Mean Square	F	P
Corrected Model	6.199	3	2.066	1.750	0.174
Intercept	937.992	1	937.992	794.553	0.000
Training Method (A)	3.540	1	3.540	2.999	0.092
Practice method (B)	2.352	1	2.352	1.993	0.167
Training Method(A)* Practice Method (B)	0.306	1	0.306	0.259	0.614
Error	42.499	36	1.181		
Total	986.690	40			
Corrected Total	48.698	39			

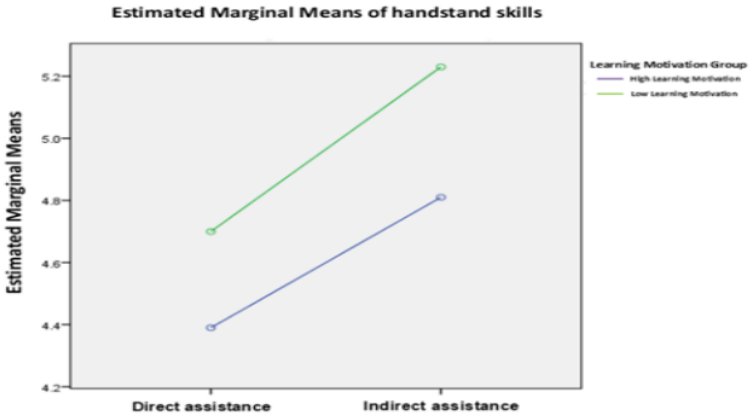

Figure 3. Interaction of Assistance with Learning Motivation

The research designed to explore the impact of direct and indirect assistance on learning motivation and handstand skills has produced interesting findings. The research hypothesis, stating that there would be a significant interaction between the type of assistance (direct and indirect) and learning motivation, was not confirmed. According to statistical analysis using two-way ANOVA and SPSS, it was found that there was no significant interaction between the two types of assistance and learning motivation, thus negating the need for further Tukey's post-hoc tests.This aligns with Sugiyono (2018), who says that if the interaction between two factors is not significant (accepting the null hypothesis), further analytical action is unnecessary. These results indicate that, at least in the context of this study, the type of assistance provided, whether direct or indirect, does not significantly influence students' learning motivation in mastering handstand skills. Other factors might play a more significant role in motivating the learning of handstand skills (Khairoh et al., 2021). This is crucial because, in the approach to motor skill learning, the common assumption is that direct assistance (such as face-to-face instruction or demonstration) tends to be more effective than indirect assistance (such as instructional videos or guidebooks). However, these findings challenge this assumption and suggest that other factors, such as individual interest, environmental factors, or different teaching methods, might play a more significant role in enhancing learning motivation (Vai et al., 2019).

Research on the impact of direct and indirect assistance on learning motivation andhandstand skills yielded interesting findings. The initial hypothesis that there is a significant interaction between the type of assistance (direct and indirect) and learning motivation was not confirmed based on statistical analysis using two-way ANOVA and SPSS. No significant interaction was found between the two types of learning aids and motivation, suggesting that further analytical action is not necessary. This finding is in line with research conducted by Suganda et al. (2022) that, if the interaction between two factors is insignificant, further analytical measures are not required. So these findings challenge common assumptions in learning. Based on previous literature, it is assumed that direct assistance and indirect assistance have an effect on the learning process, especially on floor gymnastics material (Pitnawati et al., 2023; Zulbahri et al., 2022; Zulbahri et al., 2020). However, the study showed that, at least in handstand movement, neither direct nor indirect assistance significantly affected students' learning motivation. Motivation plays a vital role in learning, especially in the handstand movement. Factors such as drive to learn, personal interest, and achievement of goals motivate students (Castillo et al., 2020; Seven, 2019).

Although direct or indirect assistance is not significant, motivation remains key for maintaining focus, increasing effort, and achieving personal satisfaction in overcoming the challenges of the Handstand movement. This is in line with research conducted by Ávalos-Ramos and Martínez Ruiz (2020), who found that carrying out difficult movements must be supported by motivation in an individual.Furthermore, the rejection of this hypothesis opens the way for more in-depth research on how students motivate themselves and how other external factors might contribute to or hinder the learning process. There is a need to explore more holistic approaches to motor skill learning, recognising that learning motivation can be influenced by various factors beyond traditional instructional methods (Syahrastani, 2022). Therefore, these findings have significant implications for teaching practices and curriculum, suggesting that educators and trainers may need to consider broader motivational strategies and diversify their teaching approaches. Further research exploring other factors that influence learning motivation and how they interact with teaching methods could provide deeper and more useful insights in the context of physical education and motor skill training.

The hypothesis testing results in this study offer intriguing insights regarding the effectiveness of direct and indirect assistance in learning handstand skills. The main finding shows that there is no significant difference in handstand skill scores between groups receiving direct assistance and those receiving indirect assistance (Syahrul, 2013). This indicates that both types of assistance are equally effective in this learning context. Direct assistance, involving direct and physical interaction between the coach and the student, and indirect assistance, using tools or media such as instructional videos or written materials, appear to be equally effective in facilitating the learning of handstands (Syahrul, 2013). This result is interesting because it is generally assumed that direct interaction, which provides immediate feedback and adjustment, would be more effective than indirect methods. However, this research challenges this assumption and implies that indirect methods can also yield comparable results in certain contexts.

Furthermore, the statistical test's significance (Sig.) value, being greater than 0.05 (in this case, 0.867), indicates that there is no significant interaction between direct and indirect assistance and learning motivation in affecting students' handstand skills. This means that, in the context of this study, there is no evidence to support the idea that the combination of direct and indirect assistance with the level of learning motivation has a different effect on handstand skills. These findings provide important insights for the practice of physical education and motor skill training, especially in the context of learning handstands. They show that approaches to motor skill learning can be more flexible than previously understood and that various learning methods, both direct and indirect, can be equally effective. It also emphasises the importance of considering individual student preferences and varying learning conditions when designing training programmes or educational courses.

The research indicates that there is no significant interaction between the type of assistance (both direct and indirect) and learning motivation in influencing handstand skills. In other words, both direct and indirect assistance, when combined with high or low levels of learning motivation, do not show a significant difference in their impact on learning handstand skills. This challenges the conventional understanding that the combination of assistance type and motivation level can significantly affect learning outcomes (Zulbahri et al., 2022). Parulian (2016) defines motivation as an internal condition or state that directs a person's behaviour to actively act to achieve a goal. Parulian (2016) defines motivation as an internal condition or state that directs a person's behaviour to actively act to achieve a goal. Derbali et al. (2019) also emphasise that learning motivation is the driving force within a person that causes them to learn, providing enthusiasm, direction, and persistence in behavior. Metekohy et al. (2022) also emphasise that learning motivation is the driving force within a person that causes them to learn, providing enthusiasm, direction, and persistence in behaviour. Therefore, theoretically, a high level of motivation should aid students in improving their handstand skills. However, the study's findings show that this is not always the case.

Interestingly, this research found that although theoretically high motivation should enhance learning, in practice, especially among students in the coaching department, (Metekohy et al., 2022) learning motivation is not good (Iswatiningrum & Sutapa, 2022). This indicates that there may be other factors influencing the learning of handstand skills that have not been identified or covered in this research. Therefore, these results suggest a need to better understand how motivation and types of assistance in learning motor skills like handstands interact. There may be other variables to consider, such as learning environment factors, teaching methods, individual student characteristics, or other psychological factors. Further research in this context can help develop more effective learning approaches for motor skills like handstands, considering the various factors that affect motivation and learning. With good learning motivation, an effective learning programmeme can be implemented, because with the implementation of a good programmeme, objective learning is achieved. Additionally, the researcher's limitation is not being able to control the psychological and nutritional methods of the players, as there are activities outside of gymnastics learning (Sularyo & Handryastuti, 2002). Physical condition factors, technical factors, tactical factors, and mental (psychological) factors all four of these cooperative factors determine sports training achievements (Popovych et al., 2021).

Performance improvement is also supported by various physical, technical, tactical, mental, coaching, facilities and infrastructure, athlete status, nutrition, etc. (Kuvaldina et al., 2024). Based on the above explanations, it is evident that to improve handstand skills in gymnastics, it is not only about using direct and indirect assistance but also determined by the learning motivation of the students. Although professors have used good teaching methods, without high learning motivation, players will not be enthusiastic about following the learning process. This leads to objectives not being effectively achieved and learning materials not being fully absorbed by students.The fourth hypothesis test reveals an interesting dynamic regarding the effectiveness of direct and indirect assistance in teaching handstand skills, especially in groups with low learning motivation. Through a descriptive statistical approach, it was found that there is no significant difference in the improvement of handstand skills between groups receiving direct and indirect assistance. With average scores of 4.81 for the indirect assistance group and 5.23 for the direct assistance group, the results descriptively show a difference, but not significantly so. This challenges the assumption that direct

assistance, typically involving face-to-face interaction and direct support from the coach, is inherently more effective than indirect assistance, especially in the context of students with low learning motivation.

Conversely, the findings indicate that indirect assistance might be just as effective as direct assistance in teaching handstand skills to students with low motivation. This suggests that when students' learning motivation is low, more independent teaching methods not reliant directly on face-to-face interaction can still be effective. This result is important in the context of physical education and motor skill training, highlighting the need to consider the motivation factor of students when choosing the right teaching strategy.The limitations of the study included a relatively small sample size and a limited focus on one particular skill: the handstand. Thus, the generalizability of these findings to other motor skills may be limited. In addition, short observation times may not allow for long-term developments in motor skill learning. The study may also not consider individual factors such as students' level of physical fitness or intrinsic motivation, which may affect learning outcomes. This weakness may affect outcomes in such a way that generalisations of findings become less strong and a deeper understanding of the learning process of motor skills becomes limited. For example, although research shows that direct and indirect assistance are equally effective in handstand learning, this may not be true for all motor skills or for all types of learners. For future studies, it will be useful to expand the sample size and variation of motor skills studied, as well as extend the observation period to track long-term development. In addition, considering individual factors such as students' level of physical fitness and intrinsic motivation can provide deeper insight into how motor skills learning can be improved. Future research may also further explore the interaction between learning methods, student characteristics, and learning contexts. For example, is there a difference in the effectiveness of learning methods between groups of students with different levels of physical fitness? Or how does student intrinsic motivation play a role in influencing learning outcomes using a variety of learning methods? Overall, the results of this study provide a solid foundation for further research in motor skill learning. By considering the weaknesses of this study and exploring new questions arising from its results, future research can lead to a deeper understanding and more effective application in the context of physical education.

CONCLUSION

This study examines the effect of direct and indirect assistance and learning motivation on handstand skills in students. The results showed no significant difference between direct and indirect assistance in improving handstand skills. Also, no significant interaction was found between this type of help and learning motivation. These findings suggest that both types of assistance are equally effective, and learning motivation does not significantly affect handstand learning outcomes. This research provides insights for effective handstand learning methods in academic environments.

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CONFLICT OF INTEREST

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