



Physical Education Teacher Attitudes toward the Stimulation of Student Higher-Order Thinking Skills

Sefri Hardiansyah, Ade Zalindro

Sport Education, Faculty of Sport Science, Universitas Negeri Padang, Indonesia

*Correspondence: E-mail: hardiansyah@fik.unp.ac.id

ABSTRACT

Higher order thinking skills (HOTS) are essential to prepare students to face challenges and make literacy activities more meaningful. However, several studies reported that Indonesian student HOTS are still low. HOTS need stimulus to develop optimally, especially for school age students (10-18 years) because, at that age, children are not yet able to think at a high level by themselves and the activity for stimulating HOTS in students is greatly affected by the teacher attitude to the value of stimulating HOTS itself. This study aimed to compare the attitude of Physical Education (PE) teachers in stimulating HOTS of students. The design of research used in this study was comparative design. The sample involved PE teachers teaching in West Sumatra province, totaling 129 people. The samples were drawn using self-selection sampling. The instrument used to measure teacher attitudes was the SHOT questionnaire. Data analysis was conducted with Mann-Whitney U test and Kruskal-Wallis test. The results showed that the teacher attitudes based on school level and teaching experience obtained $\text{Sig} > 0.05$, while the teacher attitudes according to certification status obtained $\text{Sig} < 0.05$. It concludes that the attitude of teachers based on school level and teaching experience was not significantly different, while the teacher attitudes according to certification status was significantly different.

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INTRODUCTION

In the field of education today, higher order thinking skill (HOTS) is needed to prepare students to face all challenges (Tyas & Naibaho, 2021; Singh & Marappan, 2020) because HOTS emphasizes critical thinking, trouble-shooting, and creative thinking (Astutik et al., 2020; Jaenudin et al., 2020). HOTS can help students analyze and assess information, as well as making appropriate decisions based on the information (Hardiansyah, et al. 2024). Overall, the application of HOTS in various educational settings has been proven to enhance the learning quality, making it more effective, efficient, and meaningful (Ichsan et al., 2020). Studies have indicated that HOTS-based learning can significantly improve student performance in learning (Sirad & Arbain, 2023). Therefore, HOTS has become a priority in the curriculum in various countries in the world, such as Singapore, Malaysia, South Africa, UK, and US (Liu et al., 2024; Mazibuko & Maharaj, 2024).

As in other countries in the world, students in Indonesia also need to have good HOTS to face challenges in the Society 5.0 Era marked by rapid technological advances and complex global issues (Wakifah. et al., 2023). However, amidst the world high level of attention to the student HOTS mastery, some studies have shown that the student HOTS in Indonesia from the elementary school level to high school level is still low (Ichsan & Rahmayanti, 2020; Tanujaya et al., 2021). Research found that student HOTS scores in Indonesia, at various levels, ranged from 19.9 to 22.3 (on a scale of 100) (Ichsan et al., 2019), proving that the student HOTS in Indonesia is really low. This finding was then reinforced by the results of the latest Programme for International Student Assessment (PISA) which placed Indonesia in the 69th place out of 81 nations in the world (OECD, 2023), which is the bottom 12 position. The impact of this condition will make it difficult for students to analyze and evaluate the problem. In addition, they will also find it difficult to find answers (Misrom, et al., 2020). If this continues, it will certainly cause students to be left behind in the midst of competition in the 21st century. Therefore, HOTS needs to get serious attention in learning.

Physical education is a highly favored subject for students (Jurek, 2020) and has a strategic role in promoting the student HOTS. Physical education does not only aim to improve motor skills but also to improve cognitive skills including the student HOTS (Hardiansyah, 2024). To develop the student HOTS, studies have emphasized the importance of teachers stimulating HOTS of students (Wijnen et al., 2023).

Attitudes are evaluative dispositions that vary in strengths and impacts on behaviors (Howe & Krosnick, 2017; Luttrell & Sawicki, 2020). Attitudes can be formed based on the perceived benefits and information obtained from it (Harborth & Kreuz, 2020; Kim et al., 2017). In addition, attitudes will be influenced by personal, social, historical views (Albarracin & Shavitt, 2018) and physical education teacher attitudes toward stimulations of HOTS which will be influenced by the teacher personal perceptions on the benefits provided by HOTS itself. Teacher attitudes will influence their decision whether or not to stimulate students to higher level thinking (Hardiansyah, et al., 2024). Although many parties agree that stimulating HOTS is crucial, there is limited research on teacher attitudes towards HOTS stimulations, especially about the attitudes of physical education teachers from elementary to senior high school levels. Therefore, it is important to conduct research to assess physical education teacher attitudes toward HOTS stimulations in their pupils.

Previous studies related to teacher attitudes in stimulating HOTS of students had been carried out. Among others, Wijnen et al. (2023) assessed the attitudes of elementary school teachers on HOTS stimulations by using technology. Furthermore, Wijnen et al. (2021) conducted a literature review study to investigate data on the elements influencing primary

school teacher perspectives on utilizing technology to encourage children to think higher. The study was limited to examining elementary school teacher attitudes toward HOTS stimulations outside of physical education subjects. Further research was conducted by Hardiansyah et al. (2024), assessing the attitudes of professional and non-professional physical education teachers in elementary schools in stimulating HOTS of students. The study was also still limited to physical education teachers in primary schools so information about teacher attitudes toward HOTS stimulations at the junior and senior high school levels cannot be obtained.

In contrast to previous studies, this study aimed to assess and compare the attitudes of physical education teachers to stimulate HOTS in elementary, junior high, and senior high school students which had never been found in previous studies. In addition, this study also examined differences in physical education teacher attitudes based on the teacher certification status and their teaching experiences (tenure). This research is important to be conducted to find out the physical education teacher attitudes toward the stimulations of HOTS of their students. Knowing the conditions and differences in the attitudes of physical education teachers can illustrate the teacher efforts in improving the student HOTS at each level of education, so that each school can make efforts to improve the quality of learning in accordance with the needs of each teacher to support the development of HOTS in physical education learning. In addition, the results of this study can be used to evaluate the effectiveness of teacher certification activities through the Teacher Professional Education (PPG) program in instilling positive teacher attitudes toward HOTS stimulations.

METHODS

This research is a quantitative study using a comparative design to compare physical education teacher attitudes based on teaching school levels, certification status, and tenure.

Participants

The subjects of this research were physical education teachers who were teaching in primary, junior high, and senior high schools in West Sumatra Province with a total of 129 people (male = 98, female = 31) aged 23-59 years with an average teaching experience of 9.5 years. The participants of this study involved physical education teachers teaching at the primary school level = 102 people (79.07%), junior high school level = 16 people (12.40%), and senior high school level = 11 people (8.53%). From the 120 physical education teachers involved as respondents, 63 were certified teachers and 66 were uncertified teachers.

Sampling Procedures

The sampling technique employed in this study was the self-selection technique, where participants voluntarily chose to partake, classifying it as a non-random sampling method (Bethlehem, 2018). The samples involved physical education teachers having filled out an online questionnaire distributed through the Whatsapp Group of physical education teachers and personal distributions. The online questionnaire was distributed to 12 districts and 7 cities in West Sumatra, meaning that it had represented all districts and cities in the West Sumatra province. The questionnaire had been filled in by 129 respondents who were also research samples. To ensure that respondents provided answers honestly, openly, and without feeling any pressure, the questionnaire was filled in anonymously. We ensured that there was no collection of personal identities such as names, parent numbers, school numbers, and addresses of respondents. In addition, in setting up this online questionnaire using Google Form, we did not collect email addresses from respondents. It was expected that respondents would fill in the questionnaire objectively.

Instrument and Procedures

This research instrument used the Stimulating Higher-Order Thinking (SHOT) questionnaire developed by Wijnen et al. (2021) consisting of 18 statement items. The instrument was then tested by researchers in Indonesia to assess its validity and reliability. For the content validity test, we engaged six validators comprising three lecturers with experiences in teaching or conducting research on HOTS with different educational qualifications (one magister, one doctor, and one professor), a linguists with master educational qualification, and two certified physical education teachers with bachelor educational qualifications.

The results of the content validity test with Aiken V using a scale of 4 obtained an average score, given by the validators, of 3.79 and produced a validity coefficient of 0.83-1.00. The Aiken table value was 0.78, indicating that all statements met the validity standards. Furthermore, the results of the construct validity test given to 39 physical education teachers obtained a Pearson Correlation of -0.112 - 0.758. Compared with the *r* table of 0.316, there were two invalid items (item number 15 and 17), while the rest (16 items) were stated to meet the construct validity standards. The reliability test was then carried out on 16 items that were declared valid. The results obtained a Cronbach's Alpha value of 0.846, included in the high category, so that the instrument had met the reliability standards. Furthermore, to collect data, the questionnaire was distributed online via WhatsApp Group and was closed after the online questionnaire had been circulating for \pm 4 weeks and after the researchers felt that there were no more participants filling in the questionnaire.

Data Analysis

The data analysis technique used in this research followed the rules of non-parametric statistics because the data generated from the research instrument (likert scale questionnaire) were ordinal. To test the differences of the teacher attitudes in the two sample groups, the Mann-Whitney U Test was used as the substitute for the t-test. Meanwhile, for the three sample groups, the Kruskal-Wallis test was used as the substitute for ANOVA. The data analysis did not require normality tests or homogeneity tests (Ortiz-Álvarez et al., 2023; Vrbín, 2022).

RESULTS

Based on the measurement results of the attitudes of physical education teachers toward HOTS stimulations, physical education teachers in primary schools gained a mean of 55.22, median of 55, mode of 58, standard deviation (SD) of 6.49, with the highest score of 70 and the lowest score of 40. Meanwhile, physical education teachers in junior high schools gained a mean of 54.81, median of 55, mode of 62, SD of 5.89, with the highest score of 63 and the lowest score of 47. Meanwhile, physical education teachers teaching in senior high schools gained a mean of 53.09, median of 53, mode of 53, SD of 4.64, with the highest score of 61 and the lowest score of 47 (see Table 1).

Table 1. Teacher Attitudes toward HOTS Stimulations

No.	Indicators	Teacher Teaching School Levels											
		Elementary School				Junior High School				Senior High School			
		F	%	M	SD	F	%	M	SD	F	%	M	SD
1	Perceived Relevance (PR)	1763	86.42	4.32	0.70	294	91.88	4.59	0.68	191	86.82	4.34	0.48
2	Perceived Student Ability (PSA)	1721	56.24	2.81	1.08	247	51.46	2.57	1.25	161	48.79	2.44	1.04
3	Self-Efficacy (SE)	1689	82.79	4.14	0.52	275	85.94	4.31	0.66	180	81.82	4.09	0.42
4	Context-Dependency (CD)	459	45.00	2.25	0.79	61	38.13	1.91	0.69	52	47.27	2.36	1.14

Table 1 shows that physical education teachers teaching in elementary schools obtained the highest score on item number 3 with a percentage of 88.04%, while the lowest score was on item number 15 with a percentage of 44.31%. Physical education teachers teaching in junior high schools obtained the highest score on item number 3 with a percentage of 96.25% and the lowest score on item number 16 with a percentage of 37.50%. Meanwhile, physical education teachers teaching in high schools obtained the highest score on item number 1 with a percentage of 90.91% and the lowest score on item number 7 with a percentage of 41.82%.

Physical Education Teacher Attitudes based on Teaching School Levels

Based on the measurements that had been carried out, physical education teachers teaching in primary schools obtained a mean of 55.22 and an SD of 6.49. Physical education teachers teaching in junior high schools obtained a mean of 54.81 and an SD of 5.89. Meanwhile, physical education teachers teaching in high schools gained a mean of 53.09 and an SD of 4.64. To test the differences in the attitudes of physical education teachers towards HOTS stimulations in students, the Kruskal-Wallis test was conducted (see Table 2).

Table 2. Kruskal-Wallis Test Results based on Teaching School Levels

Teacher Teaching School Levels	N	Mean	SD	Asymp. Sig.	Sig 5%
Primary School	102	55.22	6.49	0.554	0.05
Junior High School	16	54.81	5.89		
Senior High School	11	53.09	4.64		
Total	129				

Kruskal-Wallis test results in Table 2 show a Sig value of 0.554 > 0.05, indicating that the attitudes of physical education teachers based on their teaching school levels were not significantly different.

Physical Education Teacher Attitudes based on Certification Status

Based on the data obtained from respondents, there were 63 certified teachers and 66 uncertified teachers in this study. The group of certified teachers had a mean of 56.67 and an SD of 5.83, while the uncertified teacher group gained a mean of 53.38 and an SD of 6.31. To test the difference in attitudes toward HOTS stimulations between the two groups, data were analyzed by using the Whitney U test (see Table 3).

Table 3. Mann-Whitney U Test Results of Teacher Attitudes based on Certification Status

Status	N	Mean	SD	Asymp. Sig. (2-tailed)	Sig 5%
Certified	63	56.67	5.83	0.002	0.005
Uncertified	66	53.38	6.31		
Total	129				

Table 3 shows that the the Mann-Whitney U Test obtained a Sig value of 0.002 < 0.05, implying that the attitudes of certified and uncertified physical education teachers toward HOTS stimulations were significantly different. Based on the mean comparison, certified teachers had better attitudes compared to uncertified teachers.

Differences in Physical Education Teacher Attitudes based on Length of Service

The respondents of this study had a working period ranging from one month to 39 years. We divided them into four levels of teaching period. Teachers with less than 5 year teaching experience had a mean of 53.67 and an SD of 6.65. Teachers with 6-10 years of teaching experience had a mean of 56.09 and an SD of 6.86. Meanwhile, teachers with 11-15 years of teaching experience had a mean of 55.03 and an SD of 5.79. Teachers with more than 15 years of teaching experience had a mean of 69.15 and an SD of 5.25. Furthermore, a difference test was conducted on the four groups of data based on teaching experience (see Table 4).

Table 4. Results of the Kruskal-Wallis Test based on Length of Service

Teacher Tenure (Years)	N	Mean	SD	Asymp. Sig.	Sig 5%
≤ 5	41	53.76	6.65	0.587	0.05
6-10	32	56.09	6.86		
11-15	36	55.03	5.79		
> 15	20	55.65	5.25		
Total	129				

Table 4 shows that the Kruskal-Wallis test gained a Sig value of $0.587 > 0.05$, stating that the attitudes of physical education teachers toward HOTS stimulations based on teaching experience were not significantly different.

DISCUSSION

Physical Education Teacher Attitudes based on Teaching School Levels

The results showed that teacher attitudes toward HOTS stimulations at three school levels were not significantly different and were in the good category. This is an important initial step of the efforts to improve the student HOTS in schools. Research had found a positive relationship between teacher attitudes and their decisions in the learning process (Pati & Khamari, 2022). This included teacher decisions in stimulating the student HOTS. The research results of Wijnen et al. (2021) showed that teachers with a positive attitude toward HOTS encouraged students more often to be involved in higher-order thinking compared to teachers with a negative attitude toward HOTS. To facilitate the development of student HOTS in schools, the positive attitude of physical education teachers needs to be supported by improving the skills and knowledge of teachers about HOTS.

The results of the study by Ahmat et al. (2022) proved that although teachers had a positive attitude toward HOTS, teacher education programs need to be improved because the teacher knowledge and skills were often still at a moderate level. This finding was then reinforced by research results proving that teachers often showed good attitudes toward HOTS, but they lacked of knowledge and skills in HOTS implementations (Rachmawati & Purwati, 2021; Halim et al. 2021), which was later confirmed by the results of the (Wilson & Narasuman, 2020; Tasman, 2020) studies revealing that teachers at the elementary and secondary school levels still had a difficulty in designing HOTS questions and integrating them into assessments. These findings underline that physical education teachers have a good attitude toward HOTS stimulations in students, but this attitude needs to be supported by teacher knowledge and ability to plan, implement, and assess HOTS skills so that students can develop optimally. When teachers are committed to developing HOTS of the students, it is hoped that the student HOTS will be better and the overall quality of education will increase.

Physical Education Teacher Attitudes based on Certification Status

Another finding of this study revealed that there was a significant difference between the attitudes of certified physical education teachers and uncertified physical education teachers. In addition, based on the mean comparison, certified physical education teachers had better attitudes compared to uncertified teachers. This confirms that certification activities aimed at producing professional teachers have been able to instill positive attitudes toward HOTS in physical education teachers. The findings of this study are in line with the results of the study carried out by Putri (2023) showing that teacher professional development programs could significantly improve teacher HOTS abilities. A study also showed that the teacher professional knowledge had a positive impact on critical thinking, with HOTS literacy and professional development mediating this relationship (Surjanti et al., 2022).

Mastery of HOTS in teacher training programs contributes to the attainment of high-quality teachers, especially in terms of professionalism, knowledge, and teaching skills (Keong et al., 2020). Teacher certification is believed to be a useful tool to improve teacher quality. Through the certification program, teachers are given a thorough insight into HOTS (Hardiansyah et al., 2024). Through the preparation of lesson plans that contain HOTS elements and the realization of these plans at school, certified physical education teachers gain real experiences about the importance of HOTS in learning so that it help improve the performance of physical education teachers. The results of research by Hanim et al. (2020) had proved that certified teachers showed better performance compared to uncertified teachers. These findings highlight the effectiveness of teacher certification activities in promoting HOTS and underline the need for teacher professional development to improve teacher attitudes, awareness, and skills in implementing HOTS.

Physical Education Teacher Attitudes based on Teaching Experience

This study showed that, based on the length of service or teaching experience of teachers, the attitudes of physical education teachers toward HOTS did not differ significantly. This finding supports the results of research conducted by Gozali et al. (2021) which found that the teacher length of service did not show a significant influence on HOTS among teachers. The findings of this investigation provide information that teachers with long teaching experience do not necessarily have better attitudes toward HOTS compared to teachers with short teaching experience. Studies show that integrating HOTS into the education system is essential to prepare students for modern challenges (Kosasih et al., 2021). However, there are still many teachers who do not have a clear understanding of HOTS and its implementation. Younger teachers generally demonstrate better understanding but may have misconceptions about the practice, while older teachers often have less training and information on HOTS (Muliyah & Rekha, 2020). With the advantages and disadvantages of each, physical education teachers with long and short teaching experience have similar perspectives and attitudes toward HOTS.

This study is expected to provide information about physical education teacher attitudes toward HOTS stimulations in students comprehensively so that it can be a benchmark and evaluation material in the future to improve student HOTS in Indonesia. This study only investigated physical education teacher attitudes toward HOTS stimulations. There was no intervention provided by the researchers. Therefore, it is recommended that future researchers conduct research to improve the ability and knowledge of physical education teachers on planning HOTS-oriented learning, then implement the plan and assess HOTS in the physical education learning process.

CONCLUSION

The findings of this study reported that the attitudes of physical education teachers in elementary schools, junior high schools, and senior high schools toward HOTS stimulations were all in the good category, so the attitudes were not significantly different. Furthermore, based on certification status, the attitudes of certified teachers toward HOTS stimulations were significantly different, with certified teachers had better HOTS. Therefore, it implies that teacher certification activities through the Teacher Professional Education (known as PPG) program have been able to provide a positive understanding of HOTS to physical education teachers. In addition, based on the length of service of the teachers, teachers with short experience and teachers with long experience did not have significantly different attitudes toward HOTS stimulations.

AUTHORS' NOTE

The authors declare that there is no conflict of interest regarding the publication of this article. The authors confirmed that the paper was free of plagiarism.

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