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Development of physical education teacher attitude instruments towards stimulating HOTS: PE-SHOTS questionnaire

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Abstract: Students need higher-order thinking skills (HOTS) to develop optimally and answer the challenges of the 21st century. In addition, HOTS also needs stimulation in the learning process to grow optimally, and the teacher's decision to stimulate HOTS is highly dependent on the teacher's attitude towards stimulating HOTS itself. Hence, the teacher's attitude towards stimulating HOTS must be revealed. However, until now, teachers' attitudes, especially in physical education, towards stimulating HOTS have not been identified with certainty due to the unavailability of valid and reliable instruments. This study aims to develop an instrument to measure physical education teachers' attitudes toward stimulating HOTS in student. This study used a research and development design with the development stages consisting of a content validity test, ICC test, construct validity and reliability test. Based on these tests, it can be stated that 27 statement items have met the validity and reliability standards. Hence, the PE-SHOTS questionnaire instrument developed in this study is suitable.

Keywords: HOTS, PE-SHOTS Questionnaire, Physical Education

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INTRODUCTION

Higher-order thinking skills (HOTS) are essential in contemporary education to face the challenges of the 21st century (Kosasih et al., 2021; D. M. Wilson & Narasuman, 2020). The increasingly complex demands of this century require students to master HOTS to think critically, solve problems, and discover new ideas (Mitani, 2021; Zainil et al., 2022). HOTS is becoming more important as many countries worldwide integrate HOTS into their education curricula, such as Singapore, the UK, the USA, Malaysia, and China (J. Liu et al., 2024). HOTS has also become a priority in Indonesia in education, especially after introducing the 2013 curriculum (Ahmad et al., 2020). Various efforts continue to be made by the government so that students' HOTS can develop (Tanudjaya & Doorman, 2020). However, after ± 12 years of the curriculum being popularized, the results of Ichsan et al. (2019) reported that students' HOTS in Indonesia is still low, at a score of 19.9-22.3 using a scale of 100. This finding is then reinforced by the results of the Program for International Student Assessment (PISA) assessment, which places Indonesia in position 69 out of 81 countries in the world, and when compared to countries in the Southeast Asian region, Indonesia is below Singapore, Malaysia, Brunei, Vietnam and Thailand (OECD, 2023). This is certainly not in line with the expectations of the Indonesian government, which has been working to develop students' HOTS. If this continues, Indonesia will fall further behind compared to other countries. Besides that, according to Misrom et al. (2020), low HOTS will impact students' difficulty solving problems and generating new ideas. Therefore, HOTS requires special attention from all parties, especially educators who are pioneers in HOTS development.

Physical Education, as one of the most popular subjects (Jurek, 2020) and an essential part of every level of education (G. Liu & Fernando, 2024), has a strategic role in developing students' HOTS. Through physical activities, teachers can stimulate students' HOTS to be an essential asset in efforts to improve HOTS in the future. However, a person's decision towards action is strongly influenced by the attitude that the person has (Kokkinaki, 2020) and teachers' decision towards stimulating HOTS

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will be strongly influenced by their attitude towards stimulating HOTS itself (Hardiansyah et al., 2024). Therefore, physical education teachers' attitudes towards stimulating students' HOTS need to be known precisely to identify the areas where teachers need support and determine the extent to which physical education teachers make efforts to develop students' HOTS. However, this will encounter obstacles due to the unavailability of a proper instrument that can precisely measure the attitude of physical education teachers towards stimulating students' HOTS. Therefore, it is necessary to conduct a study to produce an instrument that assesses explicitly the attitude of physical education teachers towards stimulating HOTS. This is important because the characteristics of physical education, which is dominant with physical activity, are very different from those of other subjects.

Several recent studies highlighting the development of instruments assessing teachers' attitudes towards stimulating HOTS as well as those related to HOTS have been conducted including research by Wijnen et al. (2021) who developed an instrument to measure the attitude of teachers in elementary schools towards stimulating HOTS. Furthermore, Zhou et al. (2023) who designed instruments to measure critical thinking, problem solving, and innovation skills for elementary school teachers. Then Maxnun et al. (2024) have also conducted research that develops HOTS-based cognitive assessment instruments using the ADDIE development model. As well as the latest study conducted by Arthadewi et al. (2024) which designed HOTS-based learning outcomes assessment instruments in elementary schools has also been conducted. Basically, the instruments developed in these studies are able to assess teachers' attitudes in general towards HOTS and some of them can be used to assess students' HOTS in schools, but these instruments do not accommodate the measurement of physical education teachers' attitudes towards stimulating HOTS so that this has escaped the focus of previous researchers.

In contrast to the previous studies, this study aimed to develop a specific instrument to measure physical education teachers' attitudes toward stimulating HOTS in students. This study is expected to fill the gap in the instrument for assessing teachers' attitudes towards stimulating HOTS developed by Wijnen et al. (2021) by offering indicators and statements that are more relevant to physical education teachers. In addition, the instrument produced in this study is expected to contribute to identifying barriers and challenges faced by physical education teachers in implementing HOTS so that it can be the basis for the professional development of physical education teachers for future policymakers.

METHODS

This study is included in research and development using the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) development model (see Figure 1).

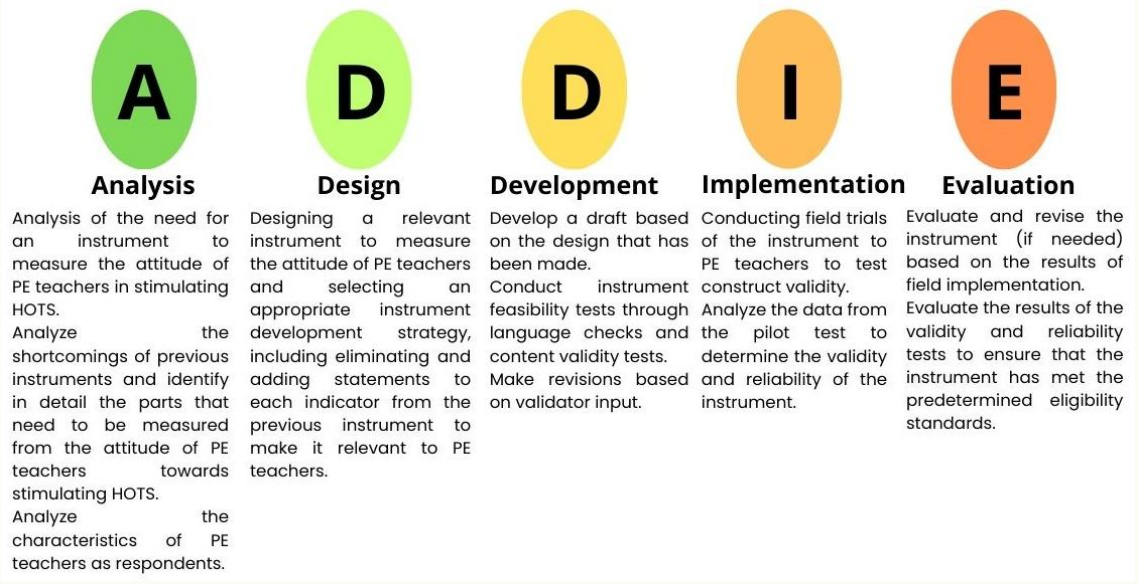

Figure 1. Research Process Flow Chart

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The stages of developing a questionnaire instrument for teachers' attitudes towards stimulating HOTS in physical education (PE-SHOTS questionnaire) using the ADDIE model are as follows:

The first stage (Analysis): is analyzing the instrument's needs and the shortcomings of the previous instrument. The instrument's needs for physical education teachers' attitudes towards stimulating HOTS were studied at this stage. As well as analyzing the relevance and shortcomings of previous instruments developed by (Wijnen et al., 2021).

Second Stage (Design): The researcher redesigned the relevant instrument to measure physical education teachers' attitudes towards stimulating HOTS and chose an appropriate instrument development strategy, eliminating some statement items and adding some statements to each indicator from the previous instrument, resulting in 34 statement items using a Likert scale. The Likert scale provides convenience, efficiency, and effectiveness in collecting data (Wilson et al., 2022; Kusmaryono & Wijayanti, 2022). Another reason is that the Likert scale has advantages such as better discrimination than other scales and more precise alternatives (Heo et al., 2022; Jebb et al., 2021). The provisions for assessing this instrument for statements with a positive meaning are strongly agreed = 5, agree = 4, doubt = 3, disagree = 2, and strongly disagree = 1; the opposite assessment applies to statements with a negative meaning. According to (Wijnen et al., 2021), there are four indicators used in the PE-SHOTS questionnaire instrument, namely:

Perceived Relevance (PR) (nine items): This indicator relates to the attitude of PE teachers towards the importance of stimulating HOTS for students' growth and life and its relevance to PE.

Perceived student ability (PSA) (seven items): this indicator refers to the attitude of PE teachers regarding whether HOTS is appropriate for all students, including “smart” students and “weak” students.

Self-efficacy (SE) (eight items): this indicator relates to PE teachers' belief in their ability to stimulate students' HOTS.

Context-dependency (CD) (ten items): This indicator relates to PE teachers' perceptions of external factors such as the support they get, media, class size, and time they have to stimulate HOTS.

Third (Development): testing the feasibility of the PE-SHOTS questionnaire. At this stage, we conducted a content validity test involving five validators, including one English expert (with a master's degree). We involved an English expert to avoid mistakes in interpreting the intent of the questionnaire developed by (Wijnen et al., 2021). The linguist did not provide an assessment of our instrument but only validated its linguistic feasibility. The next validator was one lecturer (with a doctoral degree) who has experience in physical education learning and researching HOTS in physical education. The next validator was one lecturer (with a master's degree) who teaches in the physical education Teacher Professional Education (PPG) program and is experienced in teaching HOTS material. The last validators were two physical education teachers (with bachelor's degrees) who have been certified and gained knowledge about HOTS through the PPG program. The general identity of the validators can be seen in Table 1.

Table 1. Instrument Validator

Title	Gender	Age (Years)	Afiliation
S.Pd., M.Pd	Female	36	Universitas Negeri Padang
Dr., S.Pd., M.Pd	Male	37	Universitas Kristen Artha Wacana
S.Pd., M.Pd	Male	38	Universitas Siliwangi
S.Pd., Gr	Male	40	Junior High School, West Pasaman, West Sumatra
S.Pd., Gr	Male	30	Junior High School, Agam, West Sumatra

The content validity test was evaluated using Aiken's formula (Aiken, 1985) overall the results of content validity testing obtained an average of 4.75 and a standard deviation of 0.70 (4.75 ± 0.70) with the results of 30 items declared valid and 4 invalid items.

Fourth (Implementation): After the PE-SHOTS questionnaire went through the content validation stage, the next step was to conduct a field test by distributing the questionnaire online so that the PE-SHOTS questionnaire was filled in by 53 physical education teachers who teach in elementary, junior high and high schools spread across nine districts and cities in West Sumatra province which were

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dominated by male teachers 84.91% and female teachers 15.09% with an average age of 34 years. These teachers have teaching experience in the range of 1-16 years. This stage is also to assess construct validity with the aim of ensuring that the instrument actually measures the desired concept or construct (Sjøberg & Bergersen, 2021). The results of the construct validity test showed that one item was declared constructively invalid (P value> 0.05) in the corrected item-total correlation test and two items did not meet the CFA construct validity criteria because the Anti-Image Correlation value and the Communalities value < 0.50. so that of the 30 items that passed the content validity test, 27 items remained after construct validity was carried out. At this stage, the reliability test was also carried out with Cronbach's alpa test and it was stated that the instrument had a very high reliability value (0.916).

Fifth (Evaluation): Based on the results of the pilot test, an evaluation and finalization of the PE-SHOTS questionnaire was carried out so that an instrument that met the standards of validity and reliability was produced.

RESULT AND DISCUSSION

Results

Content Validity

A total of 4 experts have rated the content validity of the PE-SHOTS questionnaire instrument using a scale of 1-5. The average expert scored 4.75, standard deviation of 0.70 (4.75 ± 0.70). In detail, expert 1 = 4.50 ± 1.16, expert 2 = 4.79 ± 0.54, expert 3 = 5.00 ± 0.00, expert 4 = 4.71 ± 0.46). The detailed assessment results of all experts can be seen in Table 2.

Table 2. Content Validity Test Results

No	Validator 1	Validator 2	Validator 3	Validator 4	Mean	SD	Aiken Score	Decision
1	5	5	5	5	5.00	0.00	1.00	Valid
2	5	5	5	5	5.00	0.00	1.00	Valid
3	5	5	5	4	4.75	0.50	0.94	Valid
4	5	5	5	4	4.75	0.50	0.94	Valid
5	5	5	5	5	5.00	0.00	1.00	Valid
6	4	5	5	5	4.75	0.50	0.94	Valid
7	5	5	5	5	5.00	0.00	1.00	Valid
8	5	4	5	5	4.75	0.50	0.94	Valid
9	5	4	5	5	4.75	0.50	0.94	Valid
10	5	5	5	5	5.00	0.00	1.00	Valid
11	2	5	5	4	4.00	1.41	0.75	Invalid
12	4	5	5	5	4.75	0.50	0.94	Valid
13	5	5	5	5	5.00	0.00	1.00	Valid
14	2	4	5	5	4.00	1.41	0.75	Invalid
15	4	5	5	5	4.75	0.50	0.94	Valid
16	5	5	5	5	5.00	0.00	1.00	Valid
17	5	5	5	4	4.75	0.50	0.94	Valid
18	5	5	5	5	5.00	0.00	1.00	Valid
19	5	5	5	4	4.75	0.50	0.94	Valid
20	5	5	5	5	5.00	0.00	1.00	Valid
21	5	5	5	5	5.00	0.00	1.00	Valid
22	5	5	5	5	5.00	0.00	1.00	Valid
23	5	5	5	5	5.00	0.00	1.00	Valid
24	5	5	5	4	4.75	0.50	0.94	Valid
25	1	3	5	4	3.25	1.71	0.56	Invalid
26	5	5	5	4	4.75	0.50	0.94	Valid

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27	5	5	5	5	5.00	0.00	1.00	Valid
28	5	5	5	5	5.00	0.00	1.00	Valid
29	5	5	5	5	5.00	0.00	1.00	Valid
30	5	5	5	5	5.00	0.00	1.00	Valid
31	1	3	5	4	3.25	1.71	0.56	Invalid
32	5	5	5	4	4.75	0.50	0.94	Valid
33	5	5	5	5	5.00	0.00	1.00	Valid
34	5	5	5	5	5.00	0.00	1.00	Valid

Based on the results of Aiken's analysis of the assessment given by the experts, the Aiken value is 0.56-1.00, while the value in the Aiken table with four raters and a scale of 1-5 is 0.88, so out of 34 statement items, four items (with numbers 11, 14, 25 and 31) were declared invalid because they obtained an Aiken value <0.88 and the remaining 30 were declared content valid.

Intraclass Correlation Coefficient (ICC)

After conducting Aiken's analysis to assess content validity, the next step is to evaluate inter-rater agreement through the Intraclass Correlation Coefficient (ICC). Based on the ICC test, a value of 0.58 was obtained. According to Koo & Li (2016), the ICC value of 0.58 is classified into the medium category, so it is feasible to proceed to the next stage, namely the construct validity test.

Construct Validity

A total of 30 statement items met the content validity standards, and then field trials were conducted with 53 physical education teachers. The construct validity test was conducted with the Corrected Item-Total Correlation (CITC). Based on the construct validity test, the calculated r-value is 0.05-0.76, while the r-table value is 0.27. Thus, one statement item that obtained a calculated r value of 0.05 < r table 0.27 was declared invalid (item number 13), and the remaining 29 items were declared to meet the construct validity standards (see Figure 2).

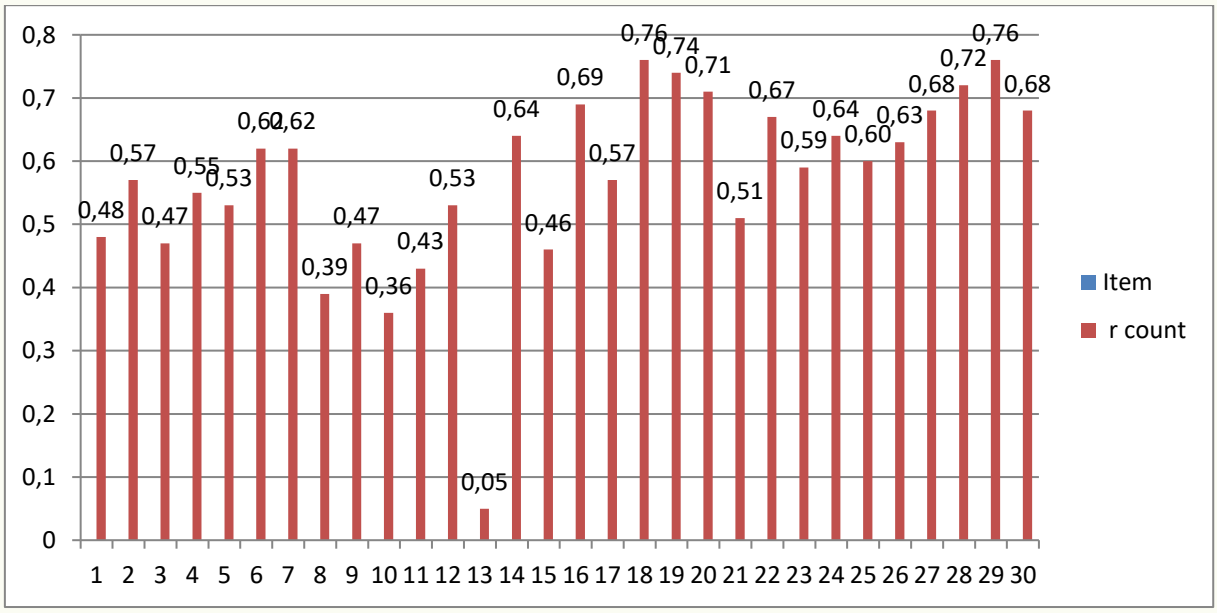

Figure 2. Construct Validity Results

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In addition to CITC, construct validity in this study is supported by Confirmatory Factor Analysis (CFA) testing. The results of the Kaiser-Meyer-Olkin Measure of Sampling Adequacy test were overall > 0.50, thus the instrument met the criteria for factor analysis (See table 3).

Table 3. Kaiser-Meyer-Olkin and Bartlett tests

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.773
Bartlett's Test of Sphericity	Approx. Chi-Square	1135.015
	df	406
	Sig.	0.000

The Anti-image Correlation (AIC) value on the Perceived Relevance (PR) indicator is in the range of 0.614-0.835 and the communalities value is 0.536-0.823, then the Perceived student ability (PSA) indicator is in the range of 0.402-0.829 and the communalities value is 0.633-0.800 so that two items (items 10 and 11) are declared unfit so they must be eliminated. Furthermore, the Self-efficacy (SE) indicator has a CFA value in the range of 0.853-0.905 and a communalities value of 0.693-0.826 and the last indicator Context-dependency (CD) has an Anti-image Correlation value in the range of 0.766-0.887 and a communalities value of 0.634-0.876. According to Blegur et al. (2024) the Anti-image Correlation value and the communalities value> 0.50 indicate that the item is feasible and can explain the factor. Based on the CFA test, it can be concluded that out of 29 items, 27 items are declared to fulfill the construct and can explain each factor. The next step is that the items that have been declared to meet the construct validity are tested for reliability (Alpa Cronbach).

Reliability Test

Based on the reliability test, Cronbach's alpha value is 0.912, which is included in the very high category. Cronbach's alpha value above 0.70 generally states that the instrument is acceptable (Cerri et al., 2023; Nagórska et al., 2022). Thus, it can be noted that the 27 items of the instrument assessing physical education teachers' attitudes towards stimulating HOTS are appropriate because they have met the validity and reliability standards. Items that have been declared valid and reliable can be seen in Table 4.

Table 4. Valid and reliable PE-SHOTS Questionnaire Instrument Items

No	Indicator	Statement	Content Validity	ICC	Construct Validity			Reliability
					CITC	CFA		
						AIC	Cmnlts	
1	PR	In my opinion, Higher-Order Thinking Skills (HOTS) are essential for students' education.	1	0.58	0.48	0.696	0.721	0.916
2		I believe that stimulating HOTS is very important for students' development.	1		0.57	0.802	0.787	
3		I think HOTS is very important for the future of students	0.94		0.47	0.835	0.536	
4		I don't think stimulating HOTS will help students in everyday life	0.94		0.55	0.529	0.802	
5		I think PE has a strategic role in encouraging students' HOTS development.	1		0.53	0.674	0.823	
6		In my opinion, physical activities in PE are very relevant for the development of students' HOTS	0.94		0.62	0.805	0.718	

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7		I think PE teachers must stimulate students' HOTS in learning because students need it.	1	0.62	0.774	0.798
8		I believe encouraging students to think at a higher order should be done at every level of education.	0.94	0.39	0.669	0.538
9		I am of the view that stimulating students' HOTS cannot be started at an early age.	0.94	0.47	0.614	0.714
10	PSA	HOTS in both “smart” and “weak” students can develop optimally if given the right stimulus.	0.94	0.53	0.720	0.737
11		If given serious attention, I believe “weak” students can think higher, just like “smart” students.	1	0.64	0.829	0.633
12	SE	I can design PE lessons that stimulate students' HOTS.	0.94	0.46	0.583	0.826
13		I can ask questions that stimulate students' HOTS in PE learning.	1	0.69	0.856	0.805
14		I do not have enough capacity to guide students in completing HOTS-stimulating tasks.	0.94	0.57	0.739	0.726
15		I can integrate HOTS into the PE learning process.	1	0.76	0.905	0.795
16		I am competent to make every material in PE a medium that encourages students' HOTS development.	1	0.74	0.873	0.746
17		I can develop questions that stimulate students' HOTS.	1	0.71	0.862	0.808
18		I can design discussions to encourage students to think at a higher order.	1	0.51	0.731	0.693
19		I was not able to overcome every obstacle encountered in trying to encourage students' HOTS.	0.94	0.67	0.758	0.800
20	CD	I will continue to encourage students to think at a higher order, even if there is no demand from the school.	0.94	0.59	0.867	0.728
21		I will encourage students to think higher even if their parents do not pay serious attention.	1	0.64	0.887	0.804
22		I will not encourage students to think at a higher order if I have limited time.	1	0.6	0.766	0.695
23		For me, the number of students will not hinder my efforts in stimulating students' HOTS	1	0.63	0.714	0.747

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24	I will continue encouraging students to think at a higher order, even in a large class.	1	0.68	0.785	0.798
25	Although not supported by adequate media and facilities, I will still stimulate students' HOTS.	0.94	0.72	0.836	0.747
26	Even with limited facilities, I am still able to stimulate students' HOTS	1	0.76	0.854	0.876
27	I will take the time to design PE lessons that stimulate students' HOTS	1	0.68	0.835	0.643

Discussion

Following the research objectives of developing an instrument to assess physical education teachers' attitudes towards stimulating HOTS in students, a series of tests or assessments have been carried out, including validity and reliability tests, to obtain a proper instrument. Proper validity and reliability testing are fundamental to ensure high-quality data collection in instrument development research so that it will produce quality data (Salleh et al., 2023; de Barros Ahrens et al., 2020; Ahmed & Ishtiaq, 2021), including assessing content validity. Content validity is one of the most critical stages to ensure that the measuring instrument represents the concept to be measured (Martínez et al., 2022). The findings of this study have proven that the 30 statement items have met the content validity standards. Content validity analysis can reveal inconsistencies between diagnostic criteria and their operationalization in measurement instruments (Karhulahti et al., 2021). Ensuring content validity is essential in developing a valid and reliable instrument (Oldland et al., 2020) and is a crucial prelude to other validity tests (Zapata-Ospina & García-Valencia, 2020).

After going through the content validity test, the ICC test is carried out to test the similarity of observations and assessments between raters (Tu et al., 2023). Intraclass Correlation Coefficient (ICC) is a measure of reliability widely used in research, primarily to assess inter-rater or rater reliability (Chenani & Madadizadeh, 2021). The results of this study have proven that the ICC value of the instrument is in the medium category. Thus, the instrument development process can proceed to the construct validity stage. Construct validity is critical to ensure the instrument accurately measures the desired concept (construct) (Alavi et al., 2023). The results of the study have proven that of the 30 statement items tested, 27 of them have met the criteria for construct validity tested with Corrected Item-Total Correlation and Confirmatory Factor Analysis (CFA). Therefore, this instrument is stated to have accurately measured the desired theoretical construct or concept (Bambling, 2024; Sjøberg & Bergersen, 2021).

The results of this study report that the perceived relevance (PR) indicator has a very high validity value (content and construct), this finding is in line with the results of research conducted by Wijnen et al. (2021) on the same indicator. In addition, based on the field test, this study also reported that the majority of physical education teachers agreed on the importance of HOTS in supporting students' lives and physical education has a strategic role in developing students' HOTS. This is in line with the opinion of Hardiansyah, (2024) that physical education should be optimized for HOTS development. This is done to prepare students to solve problems and face challenges in the 21st century (Heffington & Coady, 2023; Ichsan & Rahmayanti, 2020) because HOTS play an important role in developing deep understanding and generating new ideas (Bakry & Bakar, 2015; Heong et al., 2019). Furthermore, in the second indicator perceived student ability (PSA), several items were eliminated because they had low content validity and construct validity and after eliminating these items, the PSA indicator had high content validity and construct validity values. This finding is in line with the results of research by Wijnen et al. (2021) who also obtained good validity values on these indicators. The results of the PE-SHOTS quetionnaire field trial also provided information that physical education teachers have different attitudes towards the relevance of HOTS for students with “low” abilities. Some physical education teachers considered HOTS only suitable for students with “high” ability and others considered HOTS also suitable for students with “low” ability. This finding is in line with the

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results of Zohar et al. (2001) which proved that the majority of teachers viewed HOTS as less relevant for students with low academic achievement. This was also found in a study conducted by Tanudjaya & Doorman, (2020) which showed that some teachers viewed HOTS as more suitable for gifted students. This finding was reinforced by Schulz & FitzPatrick, (2016) research which proved that not all teachers felt able to engage students in HOTS-based learning.

Further findings in this study prove that the third indicator of self efficacy (SE) has a high value of content validity and construct validity, this is in line with the development of the SHOT instrument conducted by Wijnen et al. (2021) on the same indicator. In addition, the results of this study also show that most physical education teachers feel they have the ability to develop HOTS in the learning process. This is in line with the findings of research conducted by Sadler, (2013) which revealed that teacher confidence plays an important role in the development and use of effective teaching strategies. Teachers often face challenges in integrating HOTS into the learning process, including misconceptions about the application of HOTS itself (Gozali et al., 2021). Therefore, training and workshops are needed to improve teachers' understanding and ability to design HOTS-based learning (Edwar et al., 2023). Furthermore, the last indicator of context-dependency (CD) research results show that the results of content validity and construct validity are very good, this is in accordance with research conducted by Wijnen et al. (2021). The results of this study also reported that physical education teachers perceived that they were able to prepare HOTS-oriented physical education learning despite experiencing limited time and learning media. Alghamdi & Al-Salouli, (2013) reported that teachers faced time constraints in designing HOTS-oriented learning. These challenges are also found in the limited understanding and resources of teachers (Kosasih et al., 2021; Setyarini et al., 2018). However, the results of this study show the readiness of resources owned by physical education teachers in designing HOTS-oriented learning amid limited time and learning media. After going through the stages of testing content validity and construct validity, the next stage in developing this instrument is the reliability test. The reliability test is carried out to test the consistency and stability of the measuring instrument (Halimoon et al., 2021; Veziari et al., 2020). This study's reliability test (Cronbach's alpha) results prove the instrument's reliability is very high. Thus, the PE-SHOTS questionnaire instrument developed in this study has met the validity and reliability criteria.

In the previous Stimulating Higher-Order Thinking (SHOT) instrument developed by Wijnen et al. (2021), teachers' attitudes towards stimulating HOTS were generally measured and designed for primary school teachers. In addition, the instrument also did not reveal how teachers' attitudes towards utilizing physical activity as a medium to stimulate students' HOTS. The findings of this study expand the utilization of the instrument developed by Wijnen et al. (2021) so that the attitude towards stimulating HOTS in physical education teachers can also be assessed. Physical education differs from other subjects, as PE utilizes physical activity to achieve educational goals (Meier, 2021). Therefore, there is a need for an instrument to assess teachers' attitudes towards stimulating HOTS that is genuinely relevant to physical education, and this has been accommodated by the PE-SHOTS questionnaire instrument developed in this study. This instrument can accurately measure physical education teachers' attitudes towards stimulating HOTS.

This study provides a different perspective from previous studies, instead of focusing on the competencies and learning models used by teachers in developing HOTS, this study examines another dimension, namely the attitude of physical education teachers towards stimulating HOTS itself. This is because teachers' attitudes towards HOTS stimulation will influence their decisions and efforts in developing students' HOTS. Therefore, the results of this study are expected to contribute in accurately measuring physical education teachers' attitudes towards stimulating HOTS so that factors that support or hinder teachers in implementing HOTS in schools can be identified, thus anticipating and following up in order to develop students' HOTS in the future. However, this study has limitations because this instrument was only created to assess physical education teachers' attitudes towards stimulating HOTS. Many other elements that can influence students' HOTS development are not accommodated in this study, such as how HOTS elements are measured in the lesson plans prepared by physical education teachers and how teachers implement HOTS in the learning process. Therefore, further research can develop instruments to assess HOTS in the lesson plans prepared by teachers and measure the extent to which teachers implement HOTS in physical education learning.

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CONCLUSION

So far, the attitude of physical education teachers towards stimulating HOTS has still not been identified. The results of this study offer new value through the presence of the PE-SHOTS questionnaire. This instrument has been declared valid and reliable, so it is suitable for measuring the attitude of physical education teachers towards stimulating HOTS. This instrument can provide insight into how physical education teachers perceive the importance of HOTS for students, the relevance of HOTS for all students, their belief in their ability to stimulate and develop HOTS, and their need for external support in stimulating HOTS. This instrument can provide valuable input in identifying learning needs and physical education teacher training programs that are more effective and relevant in the future in order to develop students' HOTS. Therefore, it is suggested to all parties who have a role in improving the quality of physical education to provide support and special attention to the attitude of physical education teachers in stimulating HOTS because this can improve the overall quality of physical education learning which has implications for improving students' HOTS.

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