

# Critical Thinking Skills and Students' Problem Solving In Physical and Health Education in Obalga

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## **Abstract**

*the study investigated critical thinking skills ('CTSs') and students' problem solving in Physical and Health Education in Obio/Akpor Local Government Area (LGA) of Rivers State (R/S). The researcher adopted quasi-experimental research design. Three research questions were answered while three null hypotheses were tested in the study. The sample of the study consisted of 250 students in public junior secondary school (JSS) three in the area. Two instruments were espoused in the study titled "Physical and Health Education Performance Test (PHEPT)" and "Watson-Glaser Critical Thinking Appraisal (W-GCTA) while the former was self-designed by the research, the latter is a standardized instrument. The former instrument was validated by three experts in the subject area. The reliability of the instrument was ascertained using Cronbach alpha reliability method and afforded a coefficient of 0.78. Mean remain espoused in responding to the research questions whereas independent sample t-test stood espoused in testing the hypotheses at 0.05 level of probability. The result of the study denotes that 'CTSs' improve students' problem-solving in Physical and Health Education. Based on the result, recommendations such as teachers' integrating 'CTSs' in their teaching amongst others were made*  
**Keywords:** Critical thinking skills, problem-solving, Physical and Health Education.

## **Introduction**

The major role of education is to prepare and produce individuals who are well informed in order to proffer solutions to problems confronting them and others in the society. The solutions to the problems confronting individuals and society will not be possible without critical thinking. Mohammed (2015) suggest that the word critical is coined from the Greek word "Kritikos" meaning ability to judge. On the other hand, thinking refers to reasoning. Zhou, Hang and Tain (2013) view critical thinking as a decisive, self-governing verdict which results in clarification, scrutiny, appraisal along with impact, plus a description of the evidential, theoretical, procedural, norms or appropriate thoughtfulness upon which that judgement is established. Edward (2017) posit that the term critical thinking simply means; the impartial investigation of evidences to form a judgement. The subject matter of critical thinking is very complex. Other definitions of critical thinking therefore exist in literature. It involves rational thinking along with the capacity to detach proofs from views, scrutinize facts critically with proofs prior to accepting or refusing thoughts as well as enquiries relative to the issues at hand.

Erstad (2012) asserted that critical thinking is the scrutiny of a matter or state of affairs in addition to the proofs, records or indications associated to it. Superlatively, the latter is to be carried out factually, that means, without influence from private emotional state, sentiments or prejudices though it emphasizes exclusively on truthful facts Elkins (2014) view critical thinking as a proficiency that permits an individual to make rational plus well-versed resolutions to the best of the person's capability.

It is a procedure of appraising proofs for specific assertions, ascertaining if presented deductions rationally from the facts as well as considering alternate explanation which may arise (Fani, 2011). Scriven and Paul in Ihekweba, Nkwocha and Unamba (2019) posited that critical thinking is the knowledgeable procedure of theorizing, relating, examining, producing as well as appraising facts acquired from or gotten via surveillance, experience, thoughtfulness, perception or message. Similarly, Watson and Glaser in Mohammed (2019) asserted that critical thinking is the agreement of approach, facts plus capability which encompass the following: (i) inquisitiveness plus facility to recognize the presence of hitches as well as taking up the proofs which backs-up what is viewed factual (ii) understanding of circumstances to design a legal deduction (iii) making thoughts in addition to generalizations which are backed-up by rational proofs as well as (iv) the

proficiency to apply the boldness and understanding above. This denotes that the novel facts must be first analyzed and evaluated with countless 'CTSs' as well as backed-up with rational reasoning prior to its acceptance and usage. Thus, critical thinking refer to an individual's determination to amass, deduce, scrutinize in addition to appraise facts for the resolve of getting at a dependable plus useable decision.

There is no accurate documentation of the origin of critical thinking. However, the earliest mention of critical thinking was in the teaching of Socrates. Socrates emphasized the relevance of enquiring profound queries that investigate intensely into thoughtfulness or reasoning. Ebuk and Olowonefa (2019) explained that critical thinking is likened to Socratic questioning which the superlative recognized critical thinking teaching approach is. They explained that Socrates recommended the necessity for thinking for lucidity and rational uniformity.

Critical thinking consists of different skills. Mohammed (2019) identified some of the 'CTSs' as follows: (1) analyzing which refer to separating material or task into constituent portions as well as designates associations amid portions (2) evaluating which refer to judging the value of material against specified standards (3) creating which also refer to the capacity to put together the discrete thoughts or parts to form novel complete, establish novel associations etc.

Facione (2013) described 'CTSs' as clarification, a scrutiny, inference, appraisal, description plus self-control. Clarification is the ability to recognize as well as express the denotation or worth of varied sorts of proficiencies, circumstances etc. Scrutiny refers to the ability to identify envisioned plus real associations amid students, queries, notions, descriptions etc. Inference denotes to the capability to evaluate the trustworthiness of statement or additional illustrations that are depicts of a being's insight, expertise etc. Appraisal refers to capability to recognize as well as safe elements desirable to draw sensible deductions to form conjunctures and hypotheses, to take pertinent facts in addition to elicit the penalties flowing from facts etc. Description is the ability to give as well as to defend that reasoning in terms of the factual, theoretical etc. and to existing one's reasoning in form of cogent arguments. Self-control refers to the facility to self-deliberately monitor one's cognitive actions, the rudiments espoused in those actions plus the result deduced.

In the school system, knowledge is compartmentalized. One of the subjects offered in the school system particularly in the JSS curriculum is Physical and Health Education (PHE). The PHE is designed to develop in students' knowledge, skills and understanding they need for safe, active and healthy citizens throughout their lives. The subject has two basic components: Physical Education and Health education. It is these two basic components that are fused together into the subject. The Physical Education introduces the child to various Physical activities called games or sports which involved both indoor and field events. However, the Health component discusses several principles of hygiene that can guarantee good health. The Health Education also introduces the students to the working of different organs or systems in the body and how to take care of the body. Thus, Physical and Health Education curriculum aims at empowering students or other individuals to develop a personalized understanding of what healthy living means.

Despite the importance and relevance of Physical and Health Education curriculum, several researchers (Udoms, 2018; Owelabi, 2019) have observed continual decline in students' academic performance in the subject. A careful observation of the trend designates that the poor performance of scholars in the subject is attributed to both external and internal factors (Osagie, 2010). The external factors included but not limited to family background variables, peer pressure, mass media influence, school related variables etc. Among the internal factors are personality factors, motivation, lack of 'CTSs' etc.

The possession of 'CTSs' among the scholars in relation to their academic performance in Physical and Health Education in junior secondary schools. Adejobi (2015) tested 'CTSs' in male JSCE scholars in Physical and Health Education in Lagos State using the Walson-Glassor Critical Thinking Appraisal. He adopted the quasi-experimental research design and found that there is substantial inconsistency, the investigational group and the control group in terms of their use of critical thinking. He also resolved that 'CTSs' are a elements required in students' triumph in solving problems Physical and Health education. Nwaobasi (2016) investigated critical thinking among JSCE three students in Nsukka area in Physical and Health Education. The researcher utilized quasi-experimental research design. The sample size comprised 230 JSCE students in the area. The

researcher concluded that there is substantial difference in the 'CTSs' possessed by the experimental and control groups in solving problems in Physical and Health Education. Okafor (2017) investigated the dissimilarity in mean rating of female scholars in their use of 'CTSs' in solving problems in Physical and Health Education in Owerri Educational Zone of Imo State. The researcher observed substantial difference in the mean rating of female scholars within the investigational and control groups in solving problems in PHE. Ukase (2015) identified significant differences in students' utilization of 'CTSs' in solving problems in Physical and Health Education.

Therefore, this study aims to investigate 'CTSs' in solving problems in Physical and Health Education among JSCE students in Obio/Akpor LGA of R/S. Specifically, the study sought to do the following:

1. Appraise the difference amid the mean rating of the students in experimental as well as control groups in their 'CTSs' in solving problems in Physical and Health Education.
2. Determine the difference amid the mean rating of the male students in experimental plus the control groups in their 'CTSs' in solving problems in Physical and Health Education.
3. Examine the difference amid the mean-rating of the female students in the experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education.

### Research Questions

The following research questions were answered in the study.

1. What is the difference between the mean rating of the students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education?
2. What is the difference between the mean rating of male students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education?
3. What is the difference between the mean rating of female students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education?

### Hypotheses

The following null hypotheses were tested in the study.

1. There is no significant difference between mean rating of the students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education.
2. There is no significant difference between the mean rating of male students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education.
3. There is no significant difference between the mean rating of female students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education

### Methods

The research design for this study remained quasi-experimental research design (the researcher divided the sample into experimental and control groups). The population for this study remained students in public JSSs three in Obio/Akpor LGA. A sample of 250 students in public JSSs three was selected consisting of 130 males and 130 females drawn using simple random sampling technique. The experimental group encompass of 125 students while the control group comprises of 125 students also. The instrument used for data collection is Physical and Health Education Performance Test (PHEPT). PHEPT comprises of 50 items objective with options from A to D. It was drawn through the guide of a table of specification and W-GCTA is a test of critical thinking. This is a 40 item multiple choice test. It estimates 5-sub areas of critical thinking which include: extrapolation, appreciation of expectations, deductions, clarification as well as appraisal of opinions. This instrument was purely used in teaching the experimental group in addition to topics in PHE. The PHE Performance Test was validated by three experts in the area. Cronbach alpha was used in ascertaining the reliability of PHEPT. The instrument afforded a correlation coefficient of 0.78. The control group was taught topics in Physical and Health Education only using the traditional teaching method. The treatment period of both the experimental and control groups lasted for 3 weeks. Each session lasted for one hour. Four subject

teachers trained by the researcher were involved in the study. The research questions stood responded via mean scores while the t-test inferential statistical tool remained espoused to test the hypotheses at 0.05 level of probability.

## Results

**Research Question One:** What is the difference between the mean rating of the students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education?

**Table 1: Mean and standard deviation of experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education**

Group	N	Mean ( $\bar{X}$ )	SD	Mean Gain
Experimental Group	125	76.72	6.49	
Control Group	125	41.83	4.13	34.89

Result in Table 1 illustrates the mean rating of scholars in public JSSs in Obio/Akpor LGA of R/S while the mean rating of the experimental group is 76.72 with a standard deviation of 6.49, the mean rating of the control group is 41.83 with a standard deviation of 4.13. The outcome of this research questions is that 'CTSs' of experimental group improved their performance in Physical and Health Education.

**Hypothesis One:** There is no significant difference between the mean rating of the students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education.

**Table 2: t-test analysis on students' 'CTSs' and their solving problems in Physical and Health and Education**

Group	N	Mean ( $\bar{X}$ )	SD	Df	t-cal value	P-value	Remark
Experimental Group	125	76.72	6.49				
Control Group	125	41.83	4.13	248	29.075	0.221	Significant $H_0$ rejected

Alpha level = 0.05

The result of the t-test obtainable in Table 2 designates that the calculated t-value of 29.075 is significant at ( $P < 0.05$ ), the null hypothesis is non-acceptable. The result therefore denotes non-existence substantial variation amid mean rating of the students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education.

**Research Question Two:** What is the difference between the mean rating of male students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education?

**Table 3: Mean and standard deviation of male students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education**

Group	N	Mean ( $\bar{X}$ )	SD	Mean Gain
Experimental Group	65	72.66	6.24	
Control Group	65	40.38	4.08	32.28

Result in Table 3 denotes that the mean rating of the experimental group is 72.66 with a standard deviation of 6.24 while the mean rating of the control group is 40.38 with a standard deviation of 4.08. The mean variation amongst the experimental in addition to the control groups is 32.28. The result of the research question is that 'CTSs' of experimental group improved the problem solving of male students in Physical and Health Education.

**Hypothesis Two:** There is no significant difference between the mean rating of male students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education.

**Table 4: t-test analysis of male students' 'CTSs' in solving problems in Physical and Health Education**

Group	N	Mean ( $\bar{X}$ )	SD	Df	t-cal value	P-value	Remark
Experimental Group	65	72.66	6.24				
Control Group	65	40.38	4.08	248	34.935	0.192	Significant $H_0$ rejected

Alpha level = 0.05

The outcome of the t-test accessible in Table 4 reveals that the calculated t-value of 34.936 is significant at ( $P < 0.05$ ), the null hypothesis is rejected. The result therefore depicts existence of substantial variation amid mean rating of male students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education.

**Research Question Three:** What is the difference between the mean rating of female students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education?

**Table 5: Mean and standard deviation of female students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education**

Group	N	Mean ( $\bar{X}$ )	SD	Mean Gain
Experimental Group	60	74.83	6.28	
Control Group	60	40.56	4.11	34.27

Result in Table 5 designates that the mean rating of the experimental group is 74.83 with a standard deviation of 6.28 while the mean rating of the control group is 40.56 with a standard deviation of 4.11. The mean variation amid the experimental as well as the control groups is 34.27. The result of the research question is that 'CTSs' of experimental group improved in the problem solving in Physical and Health Education.

**Hypothesis Three:** There is no significant difference between the mean rating of female students in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education.

**Table 6: t-test analysis of female students' 'CTSs' in solving problems in Physical and Health Education**

Group	N	Mean ( $\bar{X}$ )	SD	Df	t-cal value	P-value	Remark
Experimental Group	60	74.73	6.28				
Control Group	60	40.56	4.11	248	36.074	0.188	Significant $H_0$ rejected

Alpha level = 0.05

The result of the t-test accessible in Table 6 illustrates that the calculated t-value of 36.074 is significant ( $P < 0.05$ ), the null hypothesis is rejected. The result therefore asserts the existence of noteworthy variation amongst mean rating of female scholars in experimental and control groups in their 'CTSs' in solving problems in Physical and Health Education.

### Discussion of Findings

The results of the study designates that critical thinking skills of students improved their ability to solve problems in Physical and Health Education. The variation in the mean gain amongst the experimental and control groups is 34.89. This mean difference (34.89) is significant at 0.05 level of probability. The reason for the alteration may possibly be accredited to the gaining of 'CTSs' which was infused in the teaching of Physical and Health Education. This result is in agreement with Nwaobasi (2016) that critical thinking improved the problem-solving of students in Physical and Health Education in Nsukka area as it enable scholars to advance as well as enhance higher-order thoughtful expertise, problem-solving skills, plus self-controlled learning potentials etc.

Also the result of the study denotes existence of substantial difference amid the mean rating of male as well as female public JSSs on the improvement in problem solving in Physical and Health Education in the area in the experimental and control groups. This further confirmed the fact that critical thinking skill improved the problem solving of the students in Physical and Health Education. Again this result is in agreement with Okafor (2017), Ukase (2015) and Adejori (2015) that critical thinking improved the problem-solving skills of male and female students in Physical and Health Education. This is due to acquisition of skills in inference, acknowledgement of expectations, deductions, clarification as well as appraisal of different viewpoints or opinions of experts.

## Conclusion

The critical thinking skills ('CTSs') aid individuals' aptitude to analyze and synthesize information in order to resolve difficulties in wide-ranging of areas. From the results acquired, the researcher concluded that 'CTSs' aided students' problem solving in Physical and Health Education in public JSSs in Obio/Akpor LGA.

## Recommendations

Based on the results of the study, the researcher recommends as follows:

1. Efforts must be made to formally train teachers in Physical and Health Education on how to integrate 'CTSs' in their teaching.
2. Tasks given to students in Physical and Health Education should incorporate critical thinking skills.
3. Curriculum developers and educational evaluators should incorporate 'CTSs' in developing or planning learning experiences for learners.

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