Assessing Ethics in Physics Instruction in Secondary Schools

ABSTRACT

The study assessed ethics in Physics instruction in secondary schools in Obio-Akpor Local Government Area of Rivers State, involving 56 teachers. The study adopted a descriptive survey on the Assessment of Secondary School Physics Teachers Perception on Ethics Questionnaire (ASSPTPEQ) and the science teaching methods outlay developed by Washman, Roissberg and Gross(2017). Research questions were analyzed using the percentage, mean and standard deviation. Findings of the study showed that science teachers adopt conventional lecture method a high frequency (89.29), Demonstration method (92.86%) avoiding innovative teaching strategies (collaborative 0.0%, metacognitive 0.0%, technological innovative methods of blended learning strategy (0%) and flipped classroom method (0.0%), use of models (0.0%). These existed a high level of relationship between mean scores of teachers perception of ethics and mean scores of prevalent teaching methods (r=0.772). There was a significant relationship between teaching perception of ethics and prevalent teaching methods on Physics. Based on these findings, it is recommended that teachers of Physics should avail themselves with innovative digitalized teaching methods in order to improve in students' awareness and performances in Physics and enable learners become aware of the ethical concerns in their learning experiences.

Keywords: Ethics, performance, perception, technological methods

Introduction

Teaching of science involvesinteractivecritical thinking and a reciprocal process which require teacher and students learning from each other (Alamina, 2001; Efebo,1999). Very recently, the state of science education in school has produced less proficiency in science resulting from the approach to science teaching (Ukwuije, 2004). It is currently understood that, in order for students to be considered fully proficient in science, they must be able to apply scientific principles, understand scientific laws and be able to interpret scientific phenomenon, generate and valuate scientific evidence with explanation; understand the nature and development of scientific practices and discourse. Science teaching needs to embrace knowledge of the science process skills and verification of its product. It allows for conceptual knowledge among teachers and students across many experiences. The problems of effective teaching for teachers and learners have led to development and application of models, in order to improve learning. Innovations in science teaching have made relevant pedagogical changes which have integrated the use of models; student centered teaching approaches, intervention of ICT on conceptual understanding and use of scientific models. The use of models,(tools for testing ideas and predicting of hypotheses), in explanation of concepts in order to arouse students active participation in learning. Most models are so fabricated to command ethical values, morals and to show acceptable characteristics, which stimulates the effective teaching and learning of science. The aim is to promote students' free

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exploration, within a given framework or structure, construct of knowledge based on their schema and has an overall cognition and application of different concepts in science.

Ethics has its root in moral philosophy, moral psychology and moral educational practices (Han, 2014). The branch of philosophy which tries to probe the reasoning behind our moral life with relative sensitivity to the moral stand of students directed towards attaining skills and attributes necessary for success in science. Some of the citizenship issues in science will instill awareness; proffer motivation towards the improving use of students' reasoning abilities, problem solving skills and decision making abilities in order to reverse the prevalent discouraging factors in science learning. Some of these factors include: prescribed professionalism for women influenced by culture, which as observed that some women are not allowed to easily engage in certain trade.

Some ethical issues which relate to citizenship factors are highly contested. Heater (1999) suggested that Ethics will provide the need for citizens to have knowledge and understanding of the social, legal and political system(s) in which they operate. They need skills and attitudes to make use of that knowledge and understanding, endowed with values and dispositions to put their knowledge and skills whichare beneficial to use.

Citizenship education that is linked with Ethics has three basic elements community involvement, political literacy, social and moral responsibility. The scientist is expected to have the knowledge and application of designs, product formulation, learning and practices in science in order to maintain the hygiene and more so ethics of science.

According to Wellington &Treson (2008), Ethical issues cannot be divorced from citizenship because arguably the moral dimensions, divisions, indeed; social responsibilities are drives by our ethics. The relationship is defined by Fullick &Ratchiffe (1996) that science is the process of rational inquiry which seeks to propose explanations for observations of natural phenomena while ethics is a rational inquiry by which we decide on issues that are right (good) or wrong (bad) as applied to people and their actions.

Science has played vital role in the social development of man, as a construct of human and these roles are being appreciated in scientific developments. Scientific discoveries have changed peoples' lives and thinking (spiritual development) hinged on culture. For example, in the demystification of skin ailments as demonic and incurable modern application of science, scientific diagnosis and treatment have provided cure.

Furthermore, in moral development, this has captivated the need for sustainable human developments in terms of professionalism and culture (Willington, 2014).

Science has contributed to a very high extent to citizenship education in terms of awareness and knowledge benefits. For example, areas of pollution, transportation energy production, use of materials (packaging and recycling), genetics, cloning, nature versus nurture, race, health and medicine, reproduction, communication and moreso in the areas of thinking skills, areas of legal actions, and in the areas of respect (humour). The improvement of research using information and communication technology is highly commendable. However, in terms of attitudes, there are equally changes expected in areas of critical judgment, careful evaluation and critical reading, watching and listening (Wellington, 2014).

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Ethics is therefore the hub or vital component of science. Moral education which is the inner change which is bordering on self-concept and spiritual matters, result from internalization of values), and justification of moral actions resulting from choice.

Fig. 1: The spiral of Ethics on use of higher and the various dimensions of citizenship.

Figure 1 shows that Ethics is mainly a characteristic ingredient in moral education and achievement of science in terms of its benefits the developments associated with culture, contributions of ethics to politics, scientific literacy and citizenship education.

According to the curriculum document (FME, 2009) the main objectives of the physics curriculum are to:

i) Provide basic literacy in physics for functional living.
ii) Acquire basic concepts and principles of physics as a preparation for further studies.
iii) Acquire essential scientific skills and attitude as a preparation for the technological application of physics and
iv) Stimulate and enhance creativity.

Telima and Aderonmu (2013) stated that the general sense for the secondary school physics program is to meet three main objectives, acquisition of relevant knowledge with understanding showing ability to handle and process information and problem solving through experimental skills and scientific investigations. The social dimension of scientific studies has not been given equal and important attention in terms of their processes and products. The precautionary measures in most practical in physics are geared towards reliability and coherence of obtained result or data tending towards accuracy in comparison with theoretical or critical values, agreement with stated laws or objectives of investigation. Ethics considerations in specific concepts in the physics curriculum have not been compiled, to the best of our knowledge, hence physics teachers perception/assessment of Ethics in secondary school physics instruction is necessary.

Assessing Ethics Secondary Science – pedagogical concern

Secondary science education may be regarded arguably as the formative stage of meaningful science education. At the primary science, given the rote memorization among scholars, the identification and use of the scientific processes and products are not understood as concrete, except in the upper junior secondary school at a limited level

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Students would witness modification, improved retention and performance in the sciences. The junior secondary education would witness use of questioning techniques with a view to advancing into conceptual and factual knowledge on the Basic science. The themes discussed include Man & Environment, Environmental hazards, depletion of ozone layer, and its effect, resources from living and non-living things, science and development and ethical issues in science and development. At the junior secondary school science III, Ethical Issues elaborated on scientific methods of solving problems, the effects of ways of application of science such as invention of weapons, production of dangerous chemicals, tampering with species for laboratory investigation, drugs that threaten human existence, Cyber war and criminology, and the numerous advantage of science discoveries. The adverse effects of science – use of machines leading to reduction in labour, mass extermination of life, Global warming, environmental pollution and consequences such as (extinction of plants and animals, reduction of life expectancy of man. In the senior secondary school, Basic sciences are simplified into subject areas as Biology, Physics, Chemistry and other science related subjects such as Agricultural science, Geography, Health Education and Mathematics. Content of the Physics Curriculum for instance, include radio activity, projectiles, Energy society that emphasizes on the benefits and problems of energy, including nuclear energy. A lot of teachers teach ethical issues in science, maybe without defining it appropriately but in the form of stating precautions in experiments, benefits and further rules and regulations for safety.

Teaching Ethics in Secondary School Physics

Assessing ethics in secondary schools physics begin with the question? Do secondary school students learn about ethical issues in physics?

Ethical concerns in science has many dimensions. In considering the availability of resources for learning ethics, Zeidlier (2003) and Taylor (2007), relates ethnics to resources for teaching, teacher methods and teachers experience. Teachers are required to raise ethical issues using case studies whether in biology, chemistry or physics. For example, in discussing Acids, Bases and Salt or the use of infra-red rays built batteries or cells, the teacher can raise ethical issues.

i) Is it proper to taste raw acid in order to confirm its sour tastes? How then do we avert the consequences of using raw acids when acids are found in fruits (unripe) and ginger. Tasting raw acids have grievous consequences on students' health – this is an ethical issues on health and safety.

ii) Infrared lighting tubes used in reflection and refraction experiments can be dangerous if flashed on students' eye. The dry cell (battery) or lead acid accumulator or NIFE is a safe alternative.

This may be simple but resulted from ethics of science and in consonance with a psychological research of Zimbardo (1973) in Coon (1986) where students were put in a simulated prison to probe the effects of imprisonment on healthy individuals. This resulted to depression, crying, anxiety, rage and other emotional reactions. How would a science teacher use humans in trying to explain the effect of genetics maybe in questions that might lead to invasion of the privacy of students and secret observation of men in a restroom which has been criticized.

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Teaching ethics inclusively in secondary school should therefore involve teacher pedagogical use of questioning technique and experimentation with respect to ethical practices.

Secondly teaching should be proactive, utilitarian and evaluative as consequences of a mode of instruction. According to Reiss (2009) looking at whether an action is wrong or right would require foremost looking at the consequences of a teaching procedure whether it involves harm or not. The concept of utilitarianism according to Reiss (2009) is mainly to evaluate the degree of wrongness or rightness of any issue in view of ethical considerations.

Ethical issues in secondary schools science teaching should encourage students to evaluate, in terms of their scientific knowledge and understanding and their processes of scientific inquiry on issues related to the environment, personal health and quality of life. (OCR, 2007, p6).

Precautions must be taken to protect the physical well-being of the research participants as well as their privacy, autonomy and dignity, Weihman, Reisberg and Gross, (2007). Earigan, Cooper, Keast& King (2010) specified values attached interrelated to society in recognition of its culture despite its influences by politics. Societal values of excellence, honesty, deliberate decision making, analytic mind of choice, uses of scientific products, prudence are expected to be associated with science teaching in secondary schools. According to Hiloerbrand, (2007) these values remain in close proximity, interact and or overlap. It should be ensured that in the process of content teaching morals, values, and ethics should envelop content. Teachers should see themselves as ethics or moral agents based on their knowledge and practice.

Purpose of the Study

The purpose of the study is to assess the perception of teachers on Ethics and teaching of physics in public secondary schools in Obio/Akpor Local Government Area of Rivers State.

Other objectives includes:

i) Identification of prevalent teaching methods of physics in the research area.
ii) Evaluate teachers' perception about Ethics in terms of physics science teaching, motivation and interest of science learners.
iii) What are the ethnical benefits of physics instruction?

Research Questions

The following research questions guided the study, in order to achieve the objectives:

i) What are the prevalent teaching methods of Physics in the research area?
ii) What is the teachers' perception on Ethics in terms physics science teaching, motivation and interest of science learners.
iii) What are the ethnical benefits of physics instruction?

Research Hypothesis

The null hypothesis stated for the study:

H_{O1}: There is no significant relationship between teachers' perception of ethics and prevalent teaching methods in physics instruction.

Methodology

Assessment of Secondary School physics teachers.

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The instrument Assessment of Secondary School Physics Teachers' Perception on Ethics Questionnaire (ASSPTEQ) and science teaching methods developed by used in this study.
Section A will show teachers demography such as age and years of experience.
The content comprises of teaching of physics in secondary school, Ethics of science instruction, benefits of science teaching, science and society and motivation and interest of teachers/students in science as perceived by the teachers. Each section of the questionnaire is weighted using the 4 point Likert Scale of Agreed (A), Strongly Agreed (SA), Disagree (D), Strongly Disagree (SD) of 4, 3, 2, and 1 marks each. The method of instruction is a schedule (checklist) where teachers can make a tick of what is most appropriate. It is weighted in frequency and percentage(%).

Data Analysis

The research questions were answered using descriptive statistics of mean, standard deviation (SD) and percentage while the only hypothesis is tested at 0.05 significant level usingPearson Product Moment Correlation (PPMC) on relationship.

Research question 1

What is the prevalent teaching methods in physics instruction in public secondary schools.

Table: 1.0 Prevalent Teaching method in physics instruction.

S/N	TEACHING METHOD	FREQUENCY	%
1	Computer Aided techniques (CAT)	8	14.29
2	Computer Aided Learning strategy (CBLS)	8	14.29
3	Problem solving Technique (Pst)	24	42.86
4	Concept mapping strategy	1	1.79
5	Socratic (Questioning techniques)	48	85.71
6	Use of models	-	0.0
7	Cooperation learning method	3	5.36
8	Jigsaw method	-	0.0
9	Experimental method	4	7.14
10	Lecture (conventional method)	50	89.29
11	Demonstration method	52	92.86
12	Field trip method	4	7.14
13	Collaborative method	-	0.0
14	Meta cognitive approach	-	0.0
15	Blended learning strategy	-	0.0
16	Think-Pair-share	-	0.0
17	Guided enquiry method	13	23.21
18	Concept thinking journey	2	3.57
19	Flipped classroom method	-	0.0
20	Group learning	4	7.14
	Total	**219**	

Table 1.0 revealed that Physics teachers could not use models (0%) Jigsaw method, (0%) collaborative method (0%) cognitive approach, blended learning (0%) strategy think-pair-share method (0%) flipped classroom method (0%) in teaching concepts in physics. Some of these

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techniques are applicable in educational technology in learning which is expectantly modern and resourceful in changing students behavior. Lecture method (conventional) is highly utilized in teaching concepts in Physics (89.29%) while concept mapping is least considered (1.79%) teaching of Physics using Socratic (questioning method) occupied 85.7% in table 1.0 while physics concepts were taught using experimentation method by about 7.14% teachers. use in the research area. Most teachers carried out physics demonstration during lecture (92.86%).

Research question II What Is The Teachers Perception On Ethics In Physics Instruction

Table 2:Assessment of secondary school physics teachers perception on ethics Questionnaire

	Items	**SA**	**A**	**D**	**SD**	**Total**	$\bar{x}$	**Standard Deviation**	**Decision**
1	Teachers perceive that there is no real world experiences in the curriculum content of physics.	40 (160)	16 (48)	0 (0)	0	208	3.71	1.35	Strongly agreed
2	Physical concepts relevant to the society include energy conversion, friction, environmental hazards, radioactivity, satellites, launching of projectiles etc.	56 (224)	0 (0)	0 (0)	0 (0)	224	4.00	2.0	Strongly Agreed
3	Ethics involves giving high premium to concepts that protects human beings, animals, the ecosystem and environmental safety.	14 (56)	28 84	12 36	2 2	178	3.18	0.62	Strongly?
4	Robots are alternatives to physics instrumentation in advance technology to avoid harms on humans and animals.	28 (152)	14 (42)	2 (4)	(0) (0)	198	3.54	1.27	Strongly Agreed
5	APA and NERDC disapprove regulatory research that does not have regard for human comfort and respect for student's privacy.	4 16)	30 (90)	20 (40)	2 (2)	148	2.64	0.70	Agreed
6	Students when sensitized of teaching goals and processes have prorogation for safety to leave such classes.	56 (224)	0 (0)	0 (0)	0 (0)	224	4.00	2.0	56 (224)
7	Students are not informed about roles, presumptions and influences of topics in physics before instructions.	14 (54)	14 (42)	2 (4)	24 (24)	124	2.25	0.39	Agreed
8	Teachers create comfort neutralization and adopt less exploratory method to avoid danger of boredom and	8 (32)	42 (126)	3 (6)	3 (3)	167	2.98	1.03	Agreed

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	exhaustion during physics instruction.								
9	Curriculum content are selective to avoid risks such as use of infra- red radiation, touching radioactive substances and so on.	50 (200)	4 (12)	2 (4)	0 (0)	216	3.86	1.74	Strong Agreed
10	Teachers do not seek participants consent or expose them to strategies before and after instructions.	4 16)	50 (20)	40 (80)	2 (2)	118	2.11	0.62	Agreed
11	Teachers perceive that safety emphasis is in compliance with lab practice.	24 (96)	26 (78)	4 (8)	2 (2)	184	3.29	0.86	Strongly Agreed
12	Teachers give high premium on laboratory practices in physics.	12 (48)	21 (63)	4 (8)	2 (2)	121	2.70	0.53	Agreed
13	They perceive that precautionary measures should be practiced not verbalized in concepts of electricity experiments.	14 (56)	26 (78)	10 (20)	2 (2)	156	2.86	0.61	Strongly Agreed
14	Cryogenic burns, acid spills, metal poisoning should be avoided during lab practices.	31 (124)	20 (60)	3 (6)	2 (2)	192	3.43	1.02	Strongly Agreed
15	Teaches perceive that safety measures such as use of goggle, laboratory coats, hand gloves, hand washing are practiced in public secondary schools.	4 (16	6 (18)	40 (80)	5 (6)	120	2.14	0.60	Disagreed
16	Working with equipment's and practices should embrace student's interest.	21 (84)	14 (42)	15 (30)	6 (6)	162	2.89	0.58	Agreed
17	Teachers perceive a low response to practise based on DEEE emphasis on conflict of result, management of learning environment to ensure health and avoid hazards.	4 (16)	13 (54)	4 (8)	30 (30)	108	1.93	0.36	Strongly Disagreed

Criterion mean = 2.5

Table 2.0 showed that there is a strong relationship between real world experiences and the curriculum content of physics (3.71>2.50) especially in the concept of energy conversion, friction,

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environmental hazards, radioactivity, satellites, launching of projectiles which are evidences of physics concepts that are relevant to society ($\bar{x}$:4.00>2.50). Ethics involving the protection of human beings, higher animals, ecology and environmental safety have led to alternatives of using robots in physics instrumentation in advance technology ($\bar{x}$:3.18>2.50).

Furthermore, the legislation empowering APA and NERDC disapprove regulatory research that does not have regard for human comfort products are not discharge nor do students privacy exposed do not inform students of their roles, boundaries, cases of risk hence giving students the prerogative to leave the class session if otherwise ($\bar{x}$2.25<2.50) in the research area. This may be as a result of presumption and influences of the teaching method adopted by most teachers of physics. According to the respondents, teachers create comfort ventilation and adopt less taxing and avoid exploratory to avoid danger of boredom and exhaustion ($\bar{x}$:2.98>2.50) hence it is agreed that contents of the curriculum are selected by designers to exclude danger or risk-full conceptual approaches involving use of infra-red radiation, touching of radiation substances and so on.

Respondents perceived ($\bar{x}$:2.11<2.50) that teachers of physics do not obtain participants informed consent nor expose their strategies (assumption and miss conceptions) before and after any instruction. It is a popular notion that teachers who do not adopt child-centered teaching approach would have difficulties in exposing certain modern manipulations (if any) and pre-teaching session and the post- teaching sessions in experimental work.

However, teachers perceive that safety emphasis ensured compliance on laboratory practice hence ethics is given high premium in laboratory practices (among teachers in the research area (3.29>2.70>2.50) in items 11 and 12. Physics teachers perceive that precautionary measures should not be recited but practiced in all physics concepts ($\bar{x}$: 2.86>2.50). In concepts of electricity, care must be taken to avoid high voltage mains during hands on-experiment especially when ac converters are in use .

To avoid cryogenic burns, acid spill and metal poisoning, laboratory practices should be carried out using safety measures (use of goggle, wearing of laboratory coats and hand gloves. Respondents disagreed to the practice in public secondary schools ($\bar{x}$:2.14 <2.50) despite working with equipment and practices to embrace students interest ($\bar{x}$:2.89>2.50).

DEEE (1999) emphasized control of risk, management of learning environment to ensure health and avoid hazards. Teachers perceive a low response to this practice among physics teachers ($\bar{x}$:1.93<2.50).

Research question III: What are the ethnical benefits of physics instruction?

Table 3: Ethical benefits and Physics Instruction

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S/N	Ethnical Benefits	SA	A	D	SD	$\bar{x}$	Standard Deviation	Decision
1	Teachers explain and emphasize learners in physics to know and appreciate the benefits of studying physics.	30 (120)	6 (18)	10 (20)	10 (10)	3.00	0.93	Agreed
2	Teachers emphasize the professional opportunities of physics learners.	16 (64)	18 (24)	20 40)	12 (12)	2.50	0.40	Agreed
3	Teachers use diagnostic questioning during instruction elicit students ideas, communication and areas of dissatisfaction.	10 (40)	10 (30)	30 60)	6 (6)	2.43	0.40	Disagreed
4	Teaching of physics is more to be child centered using collaborative approaches, concept cartons, software, Socratic questioning, jig saw an so on, and asking the students to make predictions	6 (24)	8 (24)	30 (60)	12 (12)	2.14	0.37	Disagreed
5	Teachers emphasize benefits of physics during science/physics instruction such as i) scientific literacy (ii) making of scientist, professions such as medicine engineering, Pharmacy other related sciences. And drive towards inclusive science instruction.	14 (56)	6 (18)	20 (40)	16 (16)	2.32	0.34	Disagreed
6	Teachers emphasize benefits of science/physics instruction such as housing clothing, health, use of appliances TV, phones, shoes, refrigeration, bowling, baking and cooking equipment etc.	10 (40)	10 (30)	20 (40)	16 (16)	2.25	0.20	Disagreed
7	Teachers inform on employability of physics learners resourcefulness,	8 (32)	6 (18)	24 (48)	18 (18)	2.07	0.26	Disagreed

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	knowledge base capacity.							
8	Attitudes of physics teachers through instruction encourage scientific attitudes such as curiosity, critical mindedness, humility, objectivity and suspended judgment (willingness to explore among student).	14 (56)	10 (30)	16 (32)	16 (16)	2.39	0.30	Disagreed
9	Teachers of physics provided insight on the methods of science teaching and interpretation of nature.	8 (32)	8 (24)	30 (60)	20 (20)	2.42	0.32	Disagreed
10	Teaching of physics is inclusive to science.	10 (40)	14 (15)	16 (32)	24 (24)	1.98	0.19	Disagreed

Criterion mean = 2.5

Table 3.0 ethical benefits and physics instruction, physics teachers perceived that the study of physics have immense benefits which students do know and appreciate especially during instruction ($\bar{x}$:3.00>2.50). the professional during instruction ($\bar{x}$: 2.50≥ 2.50). however, teachers do not make use of diagnostic questioning during instruction rather on evaluation. Eliciting students ideas, communication and areas of dissatisfaction is not achieved ($\bar{x}$2.50>2.43). the teaching of physics is not child-centered and methods of collaboration, concept cartons, software, Socratic questioning, Jigsaw among others, are not adopted as teaching methods ($\bar{x}$:2.14<2.50). Teachers rarely emphasize the benefits of studying physics as a science especially on scientific literacy, the making of a scientist, medicine, engineering and drive towards inclusive science instruction ($\bar{x}$:2:32< 2.50). Most students are aware of the benefits of science but teachers do little to emphasize such benefits as clothing, health, using of appliances, TV, phones etc. ($\bar{x}$:2.25<2.50). The teachers disagreed to inform on employability and other resourcefulness of the barrier ($\bar{x}$:2.07<2.50).

Furthermore, the attitude of physics teachers through instruction encourage scientific attitudes such as curiosity, critical mindedness, humility, objectivity, suspended judgment and willingness to explore among student is to a low criterion value of (2.39<2.50). Most teachers expose learners of physics to an insight on the methods of science teaching ($\bar{x}$:2.42<2.50).

Teachers do not teach physics inclusively or in an integrative manner so that instruction will involve other sciences, environment and interpretation of nature but textbook board ($\bar{x}$:1.98<2.50).

Test of hypothesis

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Hypothesis I

There is no significant relationship between teachers' perception of Ethics and prevalent teaching methods in public secondary schools on physics instruction.

Table 4: Pearson Product Moment Correlation (PPMC) on relationship between Mean scores of teachers perception of ethics and mean scores of prevalent teaching methods.

Correlations

Descriptive Statistics

	Mean	Std. Deviation	N
TP	45.2692	16.71779	56
PTM	39.9615	15.78982	56

Correlations

		TP	PTM
TP	Pearson Correlation	1	.772**
	Sig. (2-tailed)		.000
	N	56	56
PTM	Pearson Correlation	.772**	1
	Sig. (2-tailed)	.000	
	N	56	56

**. Correlation is significant at the 0.01 level (2-tailed).

Table 4: showed that the relationship coefficient r is equal to (r = 0.772) 77.2% at 0.05 significant level and degree of freedom df (54) between the mean scores of teachers perception on ethics and prevalent teaching methods on physics instruction in public secondary schools in the area. the r-value critical is 0.305 while the calculated value is 0.772. r critical < r cal. Hence the hypothesis of null-significance is rejected. There is a significant relationship between teachers' perception of ethics and prevalent teaching methods on physics instruction.

Result and Discussion of Findings

The relationship between teachers perception on ethics and prevalent teaching methods in physics instruction is positive (77.2%) and significant r critical < r-calculated. This finding agrees with the findings of Zeidlier (2003) and Taylor (2007) that ethical concerns in science have many dimension of consideration such as teaching resources, methods and experience where teachers should encourage students on the scientific inquiry on issues related to the environment personal health and quality of life (OCR, 2007).

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Conclusion

The teachers should adopt relevant innovative teaching methods in physics for relevance and instruction on ethics as is embedded in the physics curriculum in secondary schools.

Recommendations

Based on the findings of this study, it is recommended that physics specialists should adopt innovative teaching strategies such as the use of models, demonstration, flipped classroom method, collaborative and blended learning methods in other to expose students to the import and practices with respect to ethics and instruction.

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