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Everyday Phenomena in Physics Education: Impact on Male and Female Students' Achievement, Attitude and Practical Skills in Urban and Peri-Urban Settings in Nigeria

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Abstract: The study integrated some everyday phenomena into the teaching and learning of Physics and determined impact of its implementation on students' achievement, attitude and practical skills. The one group pretest-posttest control group quasi-experimental design was adopted. 171 SS2 Physics students (86 males and 86 females) purposively selected from four schools across urban and rural parts of Ibadan metropolis participated in the study. Four instruments viz: instructional package on Integration of Everyday Phenomena into Physics concepts (r = 0.82), Physics achievement test (r = 0.81), Students attitude to Physics scale (r = 0.84) and Practical skills test in Physics (r = 0.81) were employed in the study. Data collected were analysed using descriptive statistics and paired and independent samples t-test. Results showed significant impact of the treatment package on students' achievement and practical skills ($p<0.05$). Also, urban school students performed better in achievement (mean = 14.81) and practical skills (mean = 15.23) than their counterparts in peri-urban schools while female students had higher practical skills score (mean = 15.20) than the males (mean = 13.94). The findings confirmed the assumption that everyday phenomena could establish a positive transfer of learners' experiential paradigm to the formal paradigm. Physics teachers should therefore, adopt the approach towards more effective students' learning and acquisition of practical skills.

Key words: Everyday phenomena, physics education, achievement, practical skills, teachers, Nigeria

INTRODUCTION

Science is the systematic study of anything that can be examined, tested and verified. As a working definition for this study, science is a human activity through which problems and questions dealing with natural phenomena can be identified and defined and solutions proposed and tested. In this process, data are collected and analyzed while available knowledge is applied to explaining the results. Through this activity, investigators add to the store of knowledge, thereby helping people to better understand their surroundings.

Applications of this knowledge also may bring about changes in society and the cultural order and may have a direct bearing on the quality of life. Meichtry (1999) also defines scientific knowledge as a product of the human process of science and its social context.

The word science is derived from the Latin word scire, meaning to know. From its early beginnings, science has developed into one of the greatest and most influential fields of human endeavor. Today, different branches of science investigate almost everything that can be observed or detected and science as a whole shapes the way we understand the universe, the planet, ourselves and other living things. These branches include Physics, Chemistry, Biology and Mathematics at the senior secondary school level (FME, 2007). Burnie also states that for a large part of recorded history, science had little relationship with people's everyday lives. Scientific knowledge was gathered for its own sake and it had few practical applications. However, with the dawn of the industrial revolution in the 18th century, this rapidly changed. Today, science has a profound effect on the way we live, largely through technology the use of scientific knowledge for practical purposes.

Redmond defines Physics as a major science, dealing with the fundamental constituents of the universe, the forces they exert on one another and the results produced by these forces. In addition to this definition, Brown and Weidner describe Physics as the basic physical science. They further argue that Physics plays an important role in all the natural sciences emphasizing that Physics can at best be defined as the science of matter, motion and energy. Its laws are typically expressed with economy and precision in the language of Mathematics. Indeed, its basic elements are comprehended in general principles and it has moved from basic to Applied Physics and also to technology. There are for example such nascent

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fields as nuclear and biomedical engineering, quantum chemistry and quantum optics, radio, x-ray and gamma-ray astronomy as well as such analytic tools as radioisotopes, spectroscopy and lasers which all stem directly from basic Physics.

Since, 1859 the Physics curriculum for senior secondary schools has undergone many innovations to accommodate changes in content, methodology and instructional materials due to societal and technological changes. The Physics curriculum for senior secondary schools in Nigeria, redesigned in 2006 (FME, 2007), encourages teachers to apply practical work in a variety of ways in order to bring out various aspects of Physics as a fundamental science. The contents of the curriculum have also been so chosen as to relate with the study of natural physical phenomenon. The underlying physical laws and principles of such phenomena and their effects on daily life have been reflected in the curriculum. It is no gain saying the fact that therefore teachers need to be aware of strategies for integrating everyday phenomena into the teaching of Physics.

According to Chen (2004) for science students in secondary schools, the basic understanding achieved in introductory Physics is the foundation for all subsequent study in Physics. Physics is often a required course for many other academic majors and they may only take Physics during secondary school and their 1st year in the university. While success in O'level Physics opens the door to opportunities in engineering, medicine and scientific research for students, failure at this level closes those career options and presses students toward non-science fields.

The Physics curriculum in use in Nigeria, suggests the teaching of the subject with inclusion of practical work and constant reference to everyday phenomena (FME, 2007) while there are many strategies that can be used in Physics teaching for effective learning, integration of everyday phenomena into classroom teaching is the focus of this study. The topics selected are elastic properties of solids, fluids in motion and simple harmonic motion. The topics were selected based on The West African Examinations Council (WAEC) Chief Examiners Reports (2000-2009) that reveal that candidates' attempt of questions on these topics have been poor with varying degrees of deficiencies ranging from ability to recall facts correctly, application to real-life situations to inadequate practical skills.

Integrating everyday phenomena into Physics teaching could also impact positively on students' attitude towards Physics. This is in tune with the view of Staver (1998) that relevance refers to activities that give students satisfaction and meet their needs including the chance to achieve personal learning goals. In order to capture students' attention and activate positive attitudes towards Physics, Physics teachers must consider the relevance of each topic to natural occurrences and phenomena. Then, they can connect science with students' interests, personal lives, societal issues, cultural backgrounds and other school subjects. Practical work which is an integral part of Physics in most countries around the world (Tiberghien *et al*., 2001) helps students to make links between the domain of real objects and observable things and the domain of ideas (Millar *et al*., 2002).

Hudson (1990) states that practical work can motivate pupils by stimulating interest and enjoyment, teach laboratory skills, enhance the learning of scientific knowledge give insight into scientific method, develop expertise in using it and develop scientific attitudes such as open-mindedness and objectivity. Practical work can indeed, foster students' conceptual understanding and provide a variety of insight into scientific methods in terms of experimental skills.

According to Beaner, Bruner states that a theory of instruction should address four major aspects:

- Predisposition to learning
- The ways in which a body of knowledge can be structured so that it can be most readily grasped by the learner
- The most effective sequences in which to present material
- The nature and pacing of rewards and punishments

Everyday phenomena as defined by Encarta Dictionaries are facts or occurrences that can be observable or notable, things that are out of the ordinary that excite people's interest and curiosity. In line with the context of this study, the FME (2007) states that the Physics curriculum in use in Nigeria attempts to make the study of Physics interesting and relevant through introduction of real-life contexts. The adoption of a wide range of learning contexts, learning and teaching strategies and assessment practices is intended to appeal to students of all abilities and aspirations and to stimulate their interest and motivation for learning. Together with other learning experiences, students are expected to be able to apply their knowledge of Physics to appreciate the relationship between Physics and other disciplines to be aware of the interconnections among science, technology, society and the environment in contemporary issues and to become responsible citizens.

Wilkinson (1999) reviewed the movement of Physics education towards context-based teaching and learning since the 1970s. The contextual approach to teaching

places the learning of Physics in real-life contexts where phenomena familiar to students' personal experiences are used as contexts for learning or otherwise incorporated as much as possible into the teachers' teaching. Including everyday phenomena into science teaching is an active learning tool designed to gain the attention and pique the curiosity of students. Examples of these everyday phenomena include cloud formation, gravity, plant growth, earthworm investigation and evaporation of water among many others. Physics concepts that can be directly linked with everyday phenomena include heat, air pressure, molecular nature of matter, Newton's laws of motion, light, temperature, smell, sound, static electricity and charged particles among many others. Meanwhile, some topics in Physics cannot be explicitly explained using everyday phenomena. These include nucleus, radioactivity and nuclear reactions. Another exciting approach to integrating everyday phenomena into Physics teaching according to Nguyen and Ng (2006) is that the approach further integrates the learning of science concepts with technological and social issues the Science, Technology and Society (STS) approach to content.

According to Hassard (2005), Ausubel believed that learning proceeds in a top-down or deductive manner. Ausubel's theory consists of three phases, presentation of an advance organizer, presentation of learning task or material and strengthening the cognitive organization. This has implication for the incorporation of everyday phenomena into education. Further, Claris postulates that everyday phenomena can be incorporated into teaching through science demonstration. In Nigeria, particularly in the South West, there are some natural phenomena that occur around which have been explained with fallacies or myths. Table 1 shows a number of these phenomena and the scientific concepts related to them.

All the science curricula in Nigeria list practical activities that should go with each curriculum item listed. Also, some Physics educators (Osborne, 1996; Woolnough, 1998) argue that practical work may be ineffective in helping students to understand the concepts and theories of science. In fact, Sere (1999) demonstrates in his research that conceptual learning cannot be expected as a side effect of any laboratory activity. Hence, in order to help students to understand the concepts and theories of Physics through practical work, it is clear that a new approach is needed.

In the light of the foregoing, Nguyen and Ng (2006) state that science lends itself to creative thinking which is characterized by fluency, flexibility, originality of ideas, openness to experience, courage and imagination. Science is seen as a subject that stimulates students' curiosity and enquiring minds and requires students to solve problems. They further point out that the practical (experimental) nature of the subject fosters teamwork and skills for manipulation of objects as well as for promoting observational, deductive and evaluative skills. These are skills that sit well within the Nigeria's Vision 2020 of training the future workforce of creative and independent people. The fact that science is concerned with learning about the real world and how things work within it means that science teachers are expected to teach students for the kind of knowledge which they can apply to real life situations. At the secondary school level, the focus of education is on the development of students' creativity as well as active and independent thinking and the teaching of skills that will enable students to apply knowledge gained to practical situations. In their learning, it is desirable that students are motivated and enjoy the learning activities. This will enhance their achievement and attitude towards Physics and their contributions towards the society which the school is an integral part of.

Table 1: List of some everyday phenomena and related Physics concepts

Phenomena	Related Physics concepts
Night and day	Motion of the earth around the sun
Crackling noise heard when taking off a nylon garment or dry sweater during harmattan	Electric charges
Killing birds with catapult	Elastic properties of solids and projectiles
Supporting tendrils of yam plant with wood	Capillarity
Oiling of moving parts of parts of a machine e.g., mill	Friction and viscosity
Riding a bicycle, levering the cap of a bottled beverage, turning off and on of a tap	Moment of a force
Maiden balancing a pot her head during traditional festivals	Centre of gravity
Swimming in a river or movement of a ship in water	Floatation
Playing the guitar, talking drum, double metal gong	Simple harmonic motion, sound waves, forced vibrations and resonance
Vibrating glass windows due to high pitch noise	Forced vibrations and resonance
Bullet fired from a gun	Newton's Third Law of Motion
Mist, fog, cloud and rain	Relative humidity and dew point
Thunder and lightening	Electric charges and speed of light
Shadow	Reflection of light wave
Mirage	Reflection of light wave (total internal reflection)
Rainbow	Reflection of light wave (dispersion of white light)
Echo	Sound waves

Dee (2007) notes that society's fundamental interest in fairness and equal opportunity continues to motivate highly contentious debates over the root causes of gender differences in educational outcomes. Much of this heated discussion, both in popular and academic settings has focused on assessing the relative contributions of biological and environmental determinants. To this end, gender is one of the factors that influence science learning (Ogunleye and Ogunsanwo, 2001; Babajide, 2010). The effect of gender on cognitive achievement in mathematics and science is still a major point of debate among educators.

This view point is based on the conflicting nature of results from researchers that focus on gender. The finding of Ariyo (2006) are significant in the aspect of gender difference in favour of boys in Physics achievement. Also, gender inequality in science, technology and mathematics is well documented in research findings including those of Ogunleye and Popoola. On the other hand, Ma (2007) and Coley (2010) report that there is no significant effect of gender on achievement in Physics. However, Opeolu notes that gender issues in science education have gained prominence with the upcoming emphasis on ways of boosting manpower for technological development as well as increasing the population of females in science and technology fields. In the light of these, this study investigated the effect of gender on achievement, attitude and practical skills of students upon integration of everyday phenomena into Physics teaching.

Another factor that affects students learning is school location. According to Ogunleye, the location of a school has an important role to play in the educational attainment of students in the school. Most studies on school location have being carried out with the focus on urban and rural locations (NCERT, 2006). However, some areas where schools are located are neither urban nor rural. A peri-urban area as the transition zone or interaction zone where urban and rural activities are juxtaposed and landscape features are subject to rapid modifications, induced by human activities. This study therefore, focused on the urban and peri-urban locations and ascertained if there is a significant difference in the performance of students from those areas.

Based on the foregoing, this study determined the impact of integrating everyday phenomena into Physics teaching on students' achievement, attitude and practical skills. It also investigated the influence of school location and gender on the dependent variables. The following hypotheses were tested at $p<0.05$.

H_{01}: There is no significant difference in the pretest and posttest:

- Achievement
- Attitude
- Practical skills

Scores of students exposed to instruction on integration of everyday phenomena into Physics teaching.

H_{02}: There is no significant difference in the posttest:

- Achievement
- Attitude
- Practical skills

Scores of students in urban and peri-urban schools exposed to the treatment.

H_{03}: There is no significant difference in the posttest scores of male and female students:

- Achievement
- Attitude
- Practical skills

MATERIALS AND METHODS

The study adopted the one group pretest-posttest quasi-experimental design. The design is illustrated as:

Pretest	Treatment	Posttest
0_1	X	0_2

Where:

0_1 = Pretest
0_2 = Posttest
X = Integration of everyday phenomena in Physics teaching

The participants for this study were 174 Senior Secondary two (SS2) students offering Physics in Ibadan, Oyo State, Nigeria. The selection was based on purposive sampling technique which involves four co-educational schools located in urban and peri-urban areas of Ibadan metropolis. The research instruments used in the study were:

- Instructional Package on Integration of Everyday Phenomena into Physics Concepts (IPIEP)

- Physics Achievement Test (PAT)
- Students' Attitude to Physics Scale (SAPS)
- Practical Skills Test in Physics (PRAST)

IPIEP was constructed by the researchers to integrate everyday phenomena into selected Physics concepts chosen for the study. It is a lesson plan for the three concepts each divided into eight parts labeled Steps I-VIII. The steps include clarification of behavioural objectives, introduction of the phenomena, introduction of the topic, discussion of the topic with reference to the phenomena, engagement of students in practical activity and relating the conclusion of activities to the phenomena. It also involves engagement of students in discussion, evaluation, conclusion and assignment. The quality of the package benefited from suggestions of experts in the area of contextual Physics teaching, some colleagues in the Science Education unit of the Faculty of Education, University of Ibadan as well as two experienced secondary school Physics teachers who are WAEC examiners. Through Scott's II formula, an inter-rater reliability coefficient of 0.82 was obtained.

PAT has two sections. Section A consists of the names of school and student as well as gender. Section B consists of 20 item multiple choice objective questions constructed by the researchers to measure the cognitive achievement in the selected Physics concepts with four options labeled A-D. The concepts on which the test is based are: elastic properties of solids, fluid at rest and in motion and simple harmonic motion. The final draft was subjected to Kuder-Richardson formula 20 (KR-20) and the reliability coefficient of 0.81 was obtained while difficulty indices of 0.53-0.69 were obtained.

SAPS is a 25 item Likert scale developed by the researchers to measure students' attitude to Physics. The items were rated on an ordinal scale of Strongly Agree (SA), Agree (A), Disagree (D) and Strongly Disagree (SD) which attracted 4, 3, 2 and 1, respectively for positively-worded items but reversed for negatively-worded items. SAPS was validated through experts' review of the items. The final draft was subjected to reliability using Cronbach Method which yielded an alpha value of 0.84.

PRAST is a practical skills test based on elastic properties of solids, fluid at rest and in motion and simple harmonic motion. The practical skills tested are planning, manipulation, observation and measuring, recording and presentation of data, analyzing data and drawing conclusions. These skills were compressed by Hayward (2003) into the procedural and manipulative skills, observational skills, drawing skills, reporting and interpretative skills. The skills were tested through three practical activities during which a combination of a rating scale of 0-5 points and students reports were used. The rating scale was subjected to inter-rater reliability (r = 0.81). The outline of the experimental activities is:

Pretest: This featured the administration of PAT, SAPS and PRAST to measure the initial performance level of students in the three dependent variables.

Treatment implementation: Based on the eight steps inherent in IPIEP, the contents were taught for 4 weeks using everyday phenomena. The 1st week presented instruction on elastic properties of solids in the 2nd week, fluids at rest and fluids in motion were the concepts treated with the students while simple harmonic motion was taught in the 3rd and 4th weeks.

Posttest: PAT, SAPS and PRAST were administered to all the students at the expiration of treatment. The data collected were analyzed using descriptive statistics, paired samples t-test and independent samples t-test.

RESULTS AND DISCUSSION

H_{o1}: There is no significant difference in the pretest and posttest:

- Achievement
- Attitude
- Practical skills

Scores of students exposed to the instructional package on integration of everyday phenomena into Physics teaching.

Table 2 shows that students exposed to the instructional package on integration of everyday phenomena into Physics concepts obtained pretest mean achievement score of 8.04 with standard deviation 2.63 while after treatment, this changed to 13.97 with standard

Table 2: Pairwise t-test for pretest and posttest achievement of students (N = 174)

Pair	Mean	SD	SEM	Mean difference	t	df	Sig.
Posttest achievement	13.97	2.55	0.19	5.93	21.56	173	0.00*
Pretest achievement	8.04	2.63	0.19				
Posttest attitude	77.17	8.78	0.67	0.87	0.84	173	0.40
Pretest attitude	76.31	10.24	0.78				
Posttest practical skills	14.58	2.77	0.21	6.93	26.54	173	0.00*
Pretest practical skills	7.65	2.12	0.16				

*Significant at $p<0.05$

deviation 2.55. The mean difference (5.93) shows that the improvement in students' achievement is much. The Table 2 further shows that the difference is significant ($t = 21.56$; $df = 173$; $p<0.05$). Based on this finding, hypothesis 1a is rejected.

Further, students' mean attitude score before treatment was 76.31 as against 77.17 at the posttest. The mean difference is a positive value of 0.87 which is very small and is not significant ($t = 0.84$; $df = 173$; $p>0.05$). Hypothesis 1b is therefore, not rejected. Table 2 also shows that the experimental group obtained a mean score (mean = 7.65; SD = 2.12) in pretest. This improved at posttest (mean = 14.58; SD = 2.77) yielding high mean difference of 6.93. More importantly, the difference in the pretest and posttest practical skills mean scores is significant ($t = 26.54$; $df = 173$; $p<0.05$). Hypothesis 1c is therefore, rejected.

H_{o2}: There is no significant difference in the posttest:

- Achievement
- Attitude
- Practical skills

Scores of students in urban and peri-urban schools exposed to the treatment.

Table 3 shows that on achievement, students from urban schools obtained higher achievement mean score (mean = 14.81; SD = 2.44) than their counterparts in peri-urban schools (mean = 12.88; SD = 2.28). This difference was found to be significant ($t = 5.32$; $df = 172$; $p<0.05$). Hypothesis 2a is therefore, rejected. Also, students' from urban schools had higher mean score (mean = 77.55; SD = 9.07) than their peri-urban peers (mean = 76.68; SD = 8.41).

This difference is however, not significant ($t = 0.65$; $df = 172$; $p>0.05$). Hypothesis 2b is therefore, not rejected. Further, Physics students from urban schools had higher posttest practical skills mean score (mean = 15.23; SD = 2.85) than their peri-urban schools counterparts (mean = 13.72; SD = 2.45). This difference was also found to be significant ($t = 3.66$; $df = 172$; $p<0.05$). Hypothesis 2c is therefore, rejected.

H_{o3}: There is no significant difference in the posttest scores of male and female students:

- Achievement
- Aattitude
- Practical skills

Table 3: The t-test comparison of students' achievement, attitude and practical skills in urban and peri-urban schools (N = 173)

Dependent variable	School location	N	Mean	SD	SEM	t	df	Sig.
Achievement	Urban	98	14.81	2.44	0.25	5.32	172	0.00*
	Peri-urban	76	12.88	2.28	0.26			
Attitude	Urban	98	77.55	9.07	0.92	0.65	172	0.52
	Peri-urban	76	76.68	8.41	0.97			
Practical skills	Urban	98	15.23	2.85	0.29	3.66	172	0.00*
	Peri-urban	76	13.72	2.45	0.28			

*Significant at $p<0.05$

Table 4: The t-test comparison of male and female students' achievement, attitude and practical skills (N = 173)

Dependent variable	School location	N	Mean	SD	SEM	t	df	Sig.
Achievement	Male	86	13.68	2.59	0.27	1.43	172	0.15
	Female	88	14.24	2.49	0.27			
Attitude	Male	86	77.69	8.69	0.94	0.78	172	0.44
	Female	88	76.65	8.87	0.95			
Practical skills	Male	86	13.94	3.04	0.33	3.07	172	0.00*
	Female	88	15.20	2.34	0.25			

*Significant at $p<0.05$

Table 4 shows female Physics students having higher posttest achievement mean score (mean = 14.24; SD = 2.49) than the male students (mean = 13.68; SD = 2.59. This difference is not significant ($t = 1.43$; $df = 172$; $p>0.05$) and hypothesis 3a is not rejected. Table 4 further shows that male students had higher attitude mean score (mean = 77.69; SD = 8.69) than their female counterparts (mean = 76.65; SD = 8.87). This difference is however, not significant ($t = 0.78$; $df = 172$; $p>0.05$) and hypothesis 3c is not rejected. The Table 4 also shows that the female Physics students obtained higher practical skills score (mean = 15.20; SD = 2.34) than their male counterparts (mean = 13.94; SD = 3.04). This difference was found to be significant ($t = 3.07$; $df = 172$; $p<0.05$).

Results indicated significant impact of treatment on students' achievement in Physics. The results showed that the instructional package on integrating everyday phenomena into Physics teaching has the potential of improving students' learning outcomes in Physics. This finding provides empirical support to earlier findings which established that integrating everyday phenomena into Physics teaching improves students' achievement in Physics (Park and Lee, 2004; Fensham, 2006). The finding that the treatment had significant impact on students' achievement in Physics is explicable considering the views of Nguyen and Ng (2006) that the ability to draw in examples from daily contexts to begin with the learning or to apply concepts learnt into familiar everyday phenomena that students observe and experience around them improves their performance in Physics. Integrating

everyday phenomena into Physics teaching was found to be effective as it captured students' interest in line with the reports of Binnie.

The finding that students' attitude towards Physics did not improve substantially is attributable to the fact that attitude is a behavior that changes over a long period of time which the study could not change significantly because the treatment was just over a period of 4 weeks. This result is at variance with Skateboard (2009), Robertson (2008, 2009), Zahorik (1996) and Welch (2010) who established that students' attitude to Physics improved after they have been exposed to teaching using real-life contexts.

The significant impact of the integration of everyday phenomena into Physics teaching on students' practical skills can be explained based on earlier findings of Hayward (2003), Millar (2004) and CBSE (2005). Millar (2004) discovered that the fundamental purpose of any practical work is to help students to make links between the domain of real objects and observable things and the domain of ideas. Science is not just a theoretical abstraction it is an attempt to describe the working of the real world around us. A hypothesis or idea in science is acceptable only if observations and experiments confirm it. For these reasons, promoting activity and experiment based learning is what integrating everyday phenomena into Physics teaching promotes.

The difference in the achievement and attitude of students from urban and peri-urban school locations negates the assumption that there exists a huge gap in the education in general and science education in particular between urban and peri-urban students. The inequality, where it exists, among these four locations could be due to poor infrastructure, inadequate support systems, lack of access to information and other resources in rural areas and a clear urban bias in various educational inputs.

It was discovered that Physics students from urban schools had significant higher posttest practical skills scores than students from peri-urban schools. The difference can be explained by the dearth of a certain minimum infrastructure and academic support in peri-urban schools which is a prerequisite for good science education in the country (FME, 2007). Most of the peri-urban schools visited before two of them were selected for this study lack functional Physics laboratories as well as access to educational information in Physics that could help motivate their interest in carrying out experiments to verify or discover the Physics behind the everyday phenomena that occur around them. This situation could hamper effective learning of Physics, especially acquisition of practical skills.

Female students obtained higher mean practical skills score than their male counterparts, a difference which turned out to be significant. This finding gives empirical support to earlier findings of Sneddon *et al.* (2009) and Gonzalez-Espada (2009). This finding further supports the view of Ma (2007) that females are bridging the gap with boys in Physics achievement with historical female breakthroughs in this traditionally male dominated discipline across existing regional and international student assessments.

CONCLUSION

This study shows taht integrating everyday phenomena into Physics is an effective method of disseminating knowledge to students. It increased students' achievement and practical skills in Physics. This works towards establishing a transfer from learners' experiential paradigm to the formal paradigm of Physics. Also, it does not only imply changes in the order of presentation of information but it is a complete change in approach to teaching. Urban school students responded better to the instructional approach especially in achievement and practical skills in Physics compared to their per-urban counterparts. Finally, gender proved to be important in favour of females in practical skills.

RECOMMENDATIONS

From the findings, it becomes necessary to make the following recommendations:

- Teachers should adopt this approach for teaching Physics by observing events and discoveries around and using them to prepare and develop lessons that reflect everyday phenomena. These everyday phenomena include historical perspective, philosophical perspectives, natural phenomena, science and technology and everyday applications of Physics
- Courses that include Physics content which are related to everyday phenomena should be introduced into teacher education programs to prepare pre-service teachers for effective dissemination of Physics concepts in their future teaching career
- Government, governmental agencies and non-governmental organizations should ensure equitable distribution of Physics laboratories, laboratory equipment and facilities, support staff and access to information in order to bridge gap between schools located in urban and peri-urban settings, especially for improved knowledge transmission and acquisition of practical skills

- The society in general should pay more attention to the education of students in science education generally but more specifically to male students whose practical skills were found to be lower than their female peers in this study

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