



2025 Electronic Book (E-Book) of Association of Science Educators Anambra (ASEA)
<http://jisepublications.org>

INNOVATIVE STRATEGIES FOR TEACHING VOCATIONAL, SCIENCE, TECHNOLOGY AND MATHEMATICS EDUCATION: CLASSROOM PRACTICES



PROF. JOSEPHINE N. OKOLI

**INNOVATIVE STRATEGIES FOR TEACHING
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MATHEMATICS EDUCATION: CLASSROOM
PRACTICES**

**EDITOR
PROF. JOSEPHINE N. OKOLI**

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A publication of Association of Science Educators Anambra (ASEA)

Printed in Nigeria in the year 2025 by:



Love Isaac Consultancy Services
No 1 Etolue Street, Ifite Awka, Anambra State, Nigeria
+234-803-549-6787, +234-803-757-7391

© Association of Science Educators Anambra (ASEA)
Anambra State, Nigeria.

ISBN: 978-978-695-938-2

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PREFACE

The electronic book (e-book) acknowledges that traditional methods in Vocational, Science, Technology and Mathematics Education: Classroom Practices may not be sufficient to equip students with the necessary skills for a rapidly evolving technological landscape.

Therefore, it advocates for the adoption of Innovative teaching approaches that promote a more dynamic and effective learning experience.

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FOREWORD

This book entitled “**Innovative Strategies for Teaching Vocational, Science, Technology and Mathematics Education: Classroom Practices**”, is a book of readings on various innovative classroom pedagogies. It is a welcome literature for Education System and a very important resource book for teachers who are functioning in the disciplines of Vocational Education, Science, Mathematics and Technology education and training. It is a compendium of most of the **active learning strategies** aimed at producing graduates who have been prepared for adaptation to the conditions of the 21st century world of fluidity. The 21st century world accommodates soft skills which the individual can edit from time to time as the conditions of socio-cultural, economic and technological environments change constantly and uncontrollably. A century in which cross-border job openings are important means of employment, a century where attitude is more important than subject-based excellence, a century where collaboration, innovation and creativity are irreducible demands by employers of labour, a century where adaptive skills are critical for entrepreneurship, creation of jobs and wealth.

All categories of teachers at all levels of education would find this resource book interesting and professionally helpful for their teaching practice. Because conditions of the modern world are in perpetual flux, teachers have to re-skill in order to produce adaptive graduates and the era of lecture method is literally over. It is these modern innovative instructional strategies that would enable teachers to produce such graduates who would survive and then succeed in the 21st century global economy.

This book would also be very useful to researchers and innovators in the envisioned pedagogic paradigm shift of this era. I therefore, proudly recommend this book, a compendium on innovative pedagogies to all classes of teachers and researchers on pedagogies and curriculum reforms in the modern era.

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DEDICATION

This book is dedicated to educators in the world

CHAPTER 2

INNOVATIVE TOOLS FOR EFFECTIVE TEACHING OF PHYSICAL AND HEALTH EDUCATION IN COLLEGES OF EDUCATION IN ANAMBRA STATE.

**Anaekwe Grace U.
Obiefuna Grace C.**

Abstract

The study aimed at identifying how innovative tools aids in effective teaching of physical and health education in Colleges of Education in Anambra State. Two research questions were formulated for the Study. All the lecturers in the two Colleges of Education were used, eight in Umunze and nine in Nwafor Orizu. Eleven items of questionnaire on innovative tools were used for data collection. The questionnaire was validated and reliability of 0.89 was established. Data were analysed using Mean. The results indicated that students that utilises innovative tools perform better than those who maintained the conventional methods, face- to- face teaching. Recommendations were made among others that Students should be provided with digital tool infrastructures to enhance online learning

Keywords: Innovative tools, Physical and Health Education.

Introduction

Physical and Health Education (PHE) is one of the discipline with double major in Colleges of Education. While Physical education is concerned with physical activities like games, athletics performed indoor or out door, health education is concerned with the overall healthy living that promotes lives and longevity. According to Bucher (2016) physical education is an integral part of the total education process, a program me aimed at the development of physically, mentally, emotionally and socially fit citizen through the medium of physical activities that have been selected with a view to realizing those outcomes. World Health Organization (WHO) in Nzegwu (2015) defined health as a state of complete physical, mental and social wellbeing and not absence of disease or infirmity. Olivet (2015) high lighten end physical and health education as a course taught in schools that focuses on developing physical fitness and ability to perform and enjoy day to day activity. Physical and health education is a learning process that focuses on knowledge, activities and behaviors that are imperative for students to embark a lifestyle of health and fitness.

However, the course which contributes immensely to fitness and health involves traditional methods of teaching such as face-to-face teaching, chalkboard and chalk, marker, pen and pencil and other such methods. Face-to-face teaching activities was brought to abrupt in the mid-May 2020 following the emergence of Covid-19 pandemic. United Nations Education, Scientific and Cultural Organization (UNESCO, 2020) stated that by mid May 2020, over 1.2 billion of the Worlds school population at all levels of education worldwide had stopped having face-to-face classes. In Nigeria, face-to-face classes closure took effect on March 19,2020 (Esomonu 2020). The unexpected closure of schools caused significantly interruptions in the Nigerian Schooling structure which includes but not limited to teaching and learning methods and access to school related services. Nlebem (2020; TEP-SESU,2020). Students in higher institution found their internships cancelled and their academic pursuits severely disrupted. Physical and Health education students in colleges of education in Anambra State were not left out of this ugly situation. Though Federal, State and Private sectors implemented various learning intervention using technological platforms, internet-based tools and traditional media to mitigate the impact of the closure of schools. Besides, Education stakeholders adapted quality and developed solutions to minimize the potential teaching and learning slides which included remote teaching and learning, printed packets, on-line learning, deployment of distance learning modality and other such formats and platform for teaching but do students responds to these innovative strategies?

The challenges faced with teaching during Covid-19 era calls for the topic Innovative Strategies: An Effective tool for teaching Physical and Health Education in Colleges of Education in Anambra State.

Effective teaching is the teaching in which the teacher /lecturer improves learners knowledge and understanding of a learned task. According to Anaekwe (2024), effective teaching is that which maximizes the learners engagement in cognitive processes as well as motor skills and character formation. The lecturer and the teacher is a person capable of transmission of knowledge and skills to others (learner). He/She instructs, guides and contributes to learners' development. Nyatuka (2020) describe lecturer/teacher as one who helps and facilitate others to learn. Teaching have been more of traditional methods, but as a result of innovations, innovative strategies should be applied to maximize performance and achieve the stated objectives in education system.

Innovation involves the introduction of something new like methods, ideas, products that leads to improvement. According to Roger, Bobble , & Ardi(2025) Innovations have included teaching with technologies like Virtual reality, gamifications, on- line application and artificial intelligence. Innovative strategies are approaches that involves thinking outside the box and using new creative ideas to achieve goals rather than relying on traditional methods .It is a structured plan that focuses on discovering and implementing new ideas to improve products ,services ,processes and others such advancements . It is a planned approaches of using new ideas and technologies to bring about significant changes in aligning activities. According to Esomonu (2022), innovations take center stage to accommodate more effective strategies. The traditional methods of face-to-face, chalkboard and chalk, marker, pen and pencil and other such methods could not improve teaching especially during certain challenges and circumstances that call for distancing learners from the lecturer /teacher. To buttress these, Esomonu(2016) stated that strategies is necessary in any training program to maximize time and resources and achieve the desired objective.

Innovative strategies in physical and health education encompasses the digital teaching tools such as virtual reality which is used in education , entertainment to enhance users experiences that is similar to or completely different from the real world (video games),Artificial intelligence which is the intelligence of machine or computer that enables it to imitate or mimic the human capabilities 1 involves the use of smart phones for chatting with friends , scrolling through our social media feeds ,looking up information online , laptops, zoom, email , goggles and other such medium of knowledge.

For effective teaching of physical and health education, innovative tools must be used but do students comply with the strategies?. It is pertinent to note that some students fail to key in into this strategies thereby making the objectives unattainable. Anyeni 2005 in Obi (2016) stressed that strategies may not be said to be effective unless they are measured as satisfactorily in terms of what they are set to achieve. Innovative strategies could not be useful unless they were utilized to improve teaching especially in physical and health education in colleges of education in Anambra state. Traditional methods of teachings need to be replaced with the innovative strategies in teaching to enhance performance.

Statement of the Problem

Physical and Health education is subject taught in tertiary institutions. Traditional methods such as face-to-face, chalkboard and chalk, marker pen and pencil have been used. This made teaching so difficult especially during some circumstances like Covid-19 pandemic. Schools were shut down and only schools in civilized areas were studying because they have acquired knowledge in the utilization of electronic tools known as innovative tools. Though some efforts were made both by ministries of education to make use of radio and television in teaching but only developed countries keyed into that but others did not. According to Obiakor & Adeniran (2020), Ministries of education released modalities for radio and television schooling and internet-based learning for students, the efforts could be effective in developed countries, but that was not the case with education system in developing low income countries like Nigeria. It is against this back drop

that the researcher moved into the topic: Innovative tools for effective teaching in Physical and Health Education in Colleges of Education in Anambra State.

Purpose of the Study

The purpose of the study is to ascertain how the innovative tools aids in students performance. Specifically, this study sought to determine the extent of agreement or otherwise as to:

1. How lecturers utilize innovative strategies in teaching physical and health education.
2. What challenges militate against lecturers' utilization of the innovative strategies in colleges of education

Research Questions

Two research questions guided the study:

1. How do lecturers utilize innovative tools in teaching physical and health education.?
2. What challenges militate against lecturers' utilization of innovative tools in teaching in Colleges of Education?

Method

Descriptive survey research design was utilized for the study. Colleges of Education in Anambra state: Federal college of Education (Technical), Umunze and Nwafor Orizu college of Education, Nsugbe were the area for the study. The population for the study consisted all the lecturers in PHE in the two colleges of education, eight (8) lecturers in Umunze and nine (9) lecturers at Nsugbe, making it seventeen (17) in number. No sampling was made because the population was considered manageable. Instrument for data collection was questionnaire on innovative Strategies: A tool for Effective Teaching in Physical and Health education in Colleges of Education in Anambra State. Linkert four level of rating scale of Strongly Agree=4 (SA), Agree=3(A), Disagree=2 (D), Strongly Disagree=1(SD) was used. The questionnaire was validated and reliability of 0.89 was established using Cronbach alpha. Data were analyzed using mean for decision making, a mean value less than 2.50 is considered disagree and 2.50 and above was considered agree.

Results

Research Question One: How do lecturers utilise innovative tools in teaching Physical and Health Education?

Table 1: Mean rating of utilization of innovative tools in teaching physical and health education in colleges of education in Anambra state.

S/N	Items	SA	A	D	SD	N	\bar{X}	Remark
1	utilizes innovative strategies in teaching PHE (on-line)	6	5	3	3	17	2.82	Agree
2	I utilizes zoom link in teaching PHE	3	4	8	2	17	2.47	Disagree
3	I utilizes google app in Generating new information	7	5	2	3	17	2.49	Agree
4	I utilizes emails in giving Assignment in PHE	6	5	3	3	17	2.82	Agree
5	I utilizes laptop in teaching PHET	7	5	3	2	17	3.00	Agree
6	I utilizes video calls via Whatsapp in teaching PHE	6	5	2	4	17	2.76	Agree
7	I utilizes smartphones in Teaching PHE	6	6	2	3	17	2.88	Agree
Grand mean								2.74 Agree

Table 1 shows that items number 1,3,4,5 6 & 7 evidenced that lectures utilizes innovative strategies such as google app , emails ,laptops ,video and smartphones in teaching PHE with mean ratings of 2.82,2.94,2.82,3.00,2.76 & 2.88 respectively while item number 2shows that some lecturers do not use zoom links in teaching with mean rating of 2.47 which is below cut-off point .The grand mean of 2.74 indicated that lecturers utilizes most of the innovative strategies in teaching PHE thereby encouraging students and enhancing performance.

Research Question Two: What challenges militate against lecturers' utilization of innovative tools in Colleges of Education?

Table 2: Mean rating of the challenges encountered by lecturers in utilizing innovative strategies in teaching PHE in colleges of education in Anambra state.

S/N	Items	SA	A	D	SD	N	\bar{X}	Remark
1	Students were not attentive in Utilizing the innovative strategies (online)	7	7	2	1	17	3.00	Agree
2	Many students do not turn out during zoom lectures	7	5	3	2	17	3.00	Agree
3	Students do not use google app to search for information	6	6	3	2	17	2.94	Agree
4	Assignment given through emails not done by students	6	5	3	3	17	3.13	Agree
Grand Mean							3.02	Agree

In Table 2, it indicated that lecturers meet a lot of challenges in utilizing the innovative strategies in teaching PHE in colleges of education in Anambra state. such non –compliance by students, not turning out during zoom lectures, not using google app in generating new information, failure to do assignment given through emails with response options of 3.00, 3.00, 2.94 & 3.13 with grand mean of 3.02. which is above cut-off point. it was observed that students who fails to key into the innovative strategies perform poorly in their class work and in the assignment. Students that utilizes innovative strategies perform better than those who utilizes traditional methods of face-to-face and other such old methods.

Discussion

From Research Question One, a grand mean of 2.81 indicated that lecturers utilizes most of the innovative strategies in teaching PHE thereby encouraging students and enhancing performance. This implies that lecturers utilizes the innovative tools in teaching PHE thereby equipping students with new information. This is in agreement with Menkiti (2019) who asserted that use of on-line teaching provided students with learning materials and pre-recorded videos.

In Research Question two with grand mean of 3.02. which is above cut-off point, it was observed that students who fails to key into the innovative tools perform poorly in their class work and in the assignment. This means that most students do not comply with the innovative strategies as introduced by the lecturers thereby making them perform poorly in their academic works. This is in agreement with Burgess (2011) where he asserted that innovative professors can receive bad review from students, colleagues or administration despite implementing teaching methods grounded in educational research that address some of the most common students complaint and calls for best practices. Innovative lecturers therefore face result from the current culture about teaching and learning in the legal academy.

Conclusion

Based on the findings of the study some conclusion were drawn. Innovative strategies are approaches that involves thinking outside the box and using new creative ideas to achieve goals rather than relying on traditional methods. The traditional methods of teaching like face-to-face, chalkboard and chalk and marker could not met up with the trends in teaching PHE. A lot of challenges had made the traditional methods unsuitable creating an avenue to innovative methods that can promote and enhance teaching. Students were encourage to look for new ideas and information using modern means rather than relying on outdated methods. Lecturers in their efforts to impact knowledge resorts to innovative strategies in lecturing to enhance performance. It is pertinent to realized that most students do not key in into this methods thereby making their performance to be poor. This discourages lecturers since students fails to key into the methods. Innovative strategies is the only way to acquire knowledge in recent times.

Recommendation

Based on the findings of the study, the following recommendations were made;

1. Students should as a matter of urgency cooperate with lecturers in utilizing innovative tools in their studies.
2. Teachers should be sponsored to conferences to keep them abreast of innovative tools for teaching as well as effective ways of utilizing them.
3. Students should be provided with digital tools infrastructures to enhance online learning.

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