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APPRAISAL OF REMEDIATION PACKAGE FOR CORRECTING ERRORS COMMITTED IN PHYSICS EXAMINATIONS AMONGS SENIOR SECONDARY SCHOOL STUDENTS

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Abstract

The problems of students' failures in Physics examinations despite the importance of the subject to science and technological development of any nation prompted the paper. The paper discussed the effects of different approaches, strategies and models of remediation for correcting errors committed in physics examination with general emphasis on Remediation Package Approach, considering its effects in reducing errors compared to other approaches, the Remediation Package Approaches involve both lecture accompanied by written notes and problem solving activities related to subject matter where errors were committed. This paper discussed the concepts of remediation, different approaches of remediation. It was concluded that the use of remediation package is more suitable in reducing errors and increasing performance. It was also recommended that teachers, school administrators and education stakeholders should consider and apply remediation package because of its effect in correcting errors committed in Physics examinations.

Keywords*:* *Remediation, Error, Students, Committed, Package.*

Introduction

Science and technology education are to modern life what hands are to body. According to Yakubu (2003) science and technology are used to learn the forces of nature and transform the raw material with which nature endows man into goods and services for better quality of life. One of the broad aims of National Policy on Education in Nigeria is to equip students to live effectively in the age of modern science and technology. (Federal Ministry of Education, 2013). To concretize the Policy aims science subjects amongst which is physics are made core subjects taught in Nigerian secondary schools. The broad aim of physics is to explain physical phenomena occurring in nature and laboratory through observation, experimentation and theoretical formulation (Agrawai& Manon, 2015). The meaningful learning of Physics is acquired through proper planning of Physics syllabus and their relationship to environ mental issues. It is therefore important at secondary level to acquire process skills which will help students apply physics knowledge to solve everyday problem. (Zdenek & Hana, 2018).

Despite the importance of Physics education to technological advancement of the nation, the performance of Senor Secondary School Student is sometime below average. Example Agwagah (2015) reported the position and ranking of six geopolitical zones of Nigeria on students performance in NECO-SSCE from 2000-2009. He reported that Northwest zone took 6^{th} position in 2005 and 2008 and managed to keep second to the last position in 2000, 2001, 2002, 2003, 2004, 2006, 2007 and 2009 and has a mean ranking of 5.2 for the ten years of his study. Northwest zone comprises of Sokoto, Kebbi, Zamfara, Kano, Katsina, Kaduna and Jigawa states. Moreover, Adebisi

(2021) reported the percentage pass at credit levels in NECO physics examinations from 2015/2018 in Ekiti state as 40%, 55%, 47% and 58% for 2015, 2016, 2017 and 2018 respectively. Low performance in examinations were attributed to errors committed in examinations, (WAEC, 2013) considering the low performances reported in both Northern and Southern parts of the country, there is therefore the need to use different approaches of Remidiation errors to enhance performance most especially learner centered approached like Remidiation Package.

Since low performance is attributed to errors committed in examination there is therefore the need to provide remediation approaches for teachers to use for remediating the errors committed by senior secondary school students for prevention of future occurrence and better performance. Considering the fact that every subject or learning areas experience errors and require remediation makes the approaches and strategies look similar, but uniqueness and nature of every subject determine more suitable approach or strategy to be use. This paper therefore attempted to compare and select more appropriate and suitable strategy or approach remediating errors in Physics examinations.

Concept of Remediation in Education

Remediation means different things to different experts. Perin (2003) defined remediation in education as a class or activity intended to meet the needs of students who initially do not have the skills, experience or orientation necessary to perform at a level that the institutions or instructors recognize as regular for students. Yusha'u (2011) defined remediation in education as an act or process of remedying overcoming learning problems.

Strategies of Remediation

Remediation of identified errors may require some short- or long-term plan to achieve the intended goals of correction. The plan for achieving correction is called remediation strategy. Callaway and Moore (2007) presented an empirical approach to selecting a remediation strategy and opined that the success of a remediation depends on content of remediation and selecting the right strategy at the right time. They presented many competing learning theories upon which some remediation strategies were built.

Vanlehin, Siler and Moore (2007) proposed that students learn when they experience an impasses, such as getting stuck, they may be correct but uncertain and could have made a known type of error. This view may be the bases for complicit approach or strategy. This strategy may not be the best for remediating physics errors because physics errors were not identified by experiencing impasses but rather by evaluation or assessments.

Callaway and Moore (2007) believe that cognitive dissonance or disagreement occurs when a student is forced to confront an inconsistency between a strongly held but inaccurate expectation and an actual outcome. The teacher in this case shows what is wrong and the reason why the method is wrong. The remediators shows how to solve the problem, the entire task is done and practice task are given. Considering the nature of learning and using of physics Calaway and Moore (2007) strategy is more effective for remediating errors because of its combination of identification, solving and giving practice tasks.

Approaches of Remediation

With regard to remediation approach, it is referring to particular ways of treating remediation of identified errors or challenges faced or experienced by learners in a given task. Falalu (2014) identified ways of treating problems experienced by students with problem solving difficulties. These approaches are training in the method of correcting challenges, guidance and counselling, lecture method and Remediation Package.

In the training approach, the trainer prepares instruction on the general skills of problem-solving procedure. This approach is effective in solving physics related errors but requires a lot of time and pedagogical skills and strategies which may not be the best and easiest means of remediating physics errors.

The guidance and counselling approach will require verbal exchange between the teacher

and learners on how to correct identified challenges. This approach is also effective in solving physics related problems such as misconception of difficulty and lack of interest. The approach requires teacher asking students to drop or adopt certain skills that may be related to learner' identified problems. Mutual confidence, good rapport, follow up and time are required for the success of this approach which may also not be the best approach for remediating errors in Physics examinations because of difficulty in provision of the mentioned conditions and human nature of changing perceptions and interests.

Lecture method usually contained structured lecture on the identified problems with a view to promote understanding of the difficult concept or strategy. It is most use method for solving physics and other subjects related problems it required verbal communication styles, classroom management skills, time, expertise in pedagogical skills for the success of this approach which may not be the easiest method for remediating physics errors because of difficulties in satisfying the mentioned requirements and is same with usual classroom teaching from which errors occur.

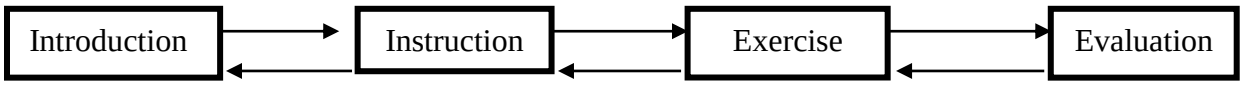
Moreover, the National Policy on Education prescribed goal delivery for teaching Physics in science learning centered, it is not suitable for teaching in secondary school both in scope and theoretical assumptions on which remediation is designed. It is not commonly used but is very effective in solving physics and other subjects related challenges. This approach may be the best because of its relevance to recommended method of teaching physics in secondary schools curriculum i.e guided discovery, non-requirement of other skills and environment as well as provision of textual material for the learner to supplement what he learned. Relevant practical examples and exercises. The approach can be considered the best for remediating physics errors among the four approaches reviewed.

The printed instruction also knowing as remediation package for diagnosed errors is an instructional material containing lesson nots, hands on activities for the subject prepared by the researcher on the topics where errors were identified. It contains textual materials and numerical exercises on subject content and instruction strategies employed in addressing the identified challenges. The content of the remediation package is obtained from textbooks, developed activities acquired in relevant workshop and tutorial materials from internet.

Falalu (2014) found Remediation Package Approach more effective in correcting errors committed by senior secondary schools students in physics. The package is arranged into units. Each unit has introduction, objectives and the content of the unit followed by some textual materials on topics where students errors were identified.

The textual materials in the remediation package are presented in hierarchical order of simplicity in line with Gagnes (1977) view that concept and skills to be learnt are to be arranged in hierarchical order, from simple to complex and from known to unknown. Ausubels (1968) learning theory which emphasized the importance of learners' previous knowledge on learning was also considered when designing the package. Some useful hands on and mind on activities were featured prominently in the textual material of the remediation package, so as to make the learner actively involved in the construction of knowledge to be learnt in agreement with constructivist view of knowledge as proposed by Piaget (1977). Problem solving method is employed as instructional method in presenting the package to address identified errors.

In order to administer the remediation package in the experimental group, a remediation flowchart designed by Falalu (2014) is use. The flowchart is as follows;



Falalu, (2014)

At the instruction stage of remediation, learners were intimated with thee reasonable for designing the remediation session and some possible benefits they may gain if they effectively and consistently attend and participated in the remediation sessions. The learners are told about how the remediation session is conducted. When remediation sessions fully started, the topic to be treated during each session and procedure of the session is given to the learners. At the instructional stage, the topics are treated with learners using materials in the remediation package. The problem-solving instructional approach is use. During instructions, area of identified errors are highlighted and how to address the errors are treated.

During interaction with learners, series of activities are employed. First step of the lesson involve review of background knowledge of learners and linking the previous knowledge with topic of the lesson. The reviews are made because learning is like a scaffolding process. Learners build new understanding on what they know earlier. The review is inform of question and posers. After the review context are created to motivate learners to prepare for learning concepts and skills embedded in the lesson. The motivators are inform of the procedure of activities conducted by students in the lesson. The learner toward effective learning of content of the lesson. Hands on and minds on activities are provided in the lesson to enrich the lesson and to enhance remediation of identified errors.

At the end of every topic, unit of remediation package or interaction stage, questions and exercises are provided to assess the students on what they have learnt and level of error remediation. The questions are given inform of classwork, homework or assignment for submission during the proceeding class. The exercises are given to give learners opportunity to test and confirm their level of grip to subject materials treated during the instruction stage.

At the evaluation stage, the learners attempt on the given exercises are assessed by the teacher to see the areas of their strength and weaknesses with respect to remediation. Where the learners have challenges, it is discuss with reference to the materials treated in the instructional stage. The relationship between the instruction, instruction, exercises and evaluation stages in the flowchart are made mutual in the sense that, if there is any challenge in a stage, material or activities in the previous stage, it is revisited to relate and address the identified challenge for success and overall achievement of the remediation exercise.

Lesson Plan and Teaching Method Using Remediation Package

Topic: Work, **Class**: SS3 **Time**: 1Hr

Behavioural Objective: By the end of the lesson, students are expected to (i) Correcting errors committed in defining work
(ii) correct errors committed in solving work related exercise

Instructional materials:

Supplying Written definition of work on cardboard paper and solution to different work related exercise with correct ones.

Introduction

Students to be given time to glance at correct and wrong cardboard paper.

Presentation

Step i: Ask students to read the wrong written cardboards
Step ii: Ask students to read the correct written cardboards
Step iii: Ask students to compare the correct written and wrong written cardboard and identify their errors.
Step iv: Ask them to correct their errors using the correct cardboard available to them

Evaluation: the teacher ask student to (i) Define work correctly (ii) Solve exercise related to work correctly

Relevant Literatures on Remediation of Errors

Yusha'u (2011) remediated slow learners dyslexia and dyscalculia learning difficulties in mathematics among Junior Secondary School Students of Sokoto State. The main objectives was to develop a learning pacakage for the teaching of dyslexic and dyscalculic slow learners to improve their academic performance.

A sample of eight hundred and twenty-seven J.S.S students from ten Junior Secondary Schools were used. The research compared the performance of control group exposed to lecture method and experimental group exposed to remediation package. The result shoed that student exposed to remediation package performance better than these exposed to lecture method in academic performance in physics Thomas (2002) presented a report of study focused on the deacon of an error correction package (ECP) for Senior Secondary School Physics Practical. The study compared the use of Error correction Instructional package made up of past examination questions of West African Examination Council (WAEC) covering mechanics, light, electricity and heat. The result of the study indicated that error Correction remediation Package has positive effect on students performance and reduction of errors committed by students during physics practical.

Falalu (2014) conducted a research on identification and remediation of errors committed by students in physics theory examination in Zaria, Kaduna State. He compared the use of printed instruction Remediation package for experimental students and lecture method for control student. The result of the study showed that students exposed to printed instruction remediation package performed better in Academic Performance test and reduce more errors in post test than students exposed to lecture method.

Conclusion

It was concluded that the strategy suggested by Callaway and Moore (2007) which task teacher to show what is wrong and why it is more suitable for remediating physics errors compared to strategy which believe that students learn only when they receive an impasse.

It was also concluded that remediation package using problem solving approach is more suitable for remediating physics errors compared to training, guidance and counselling and lecture approaches.

It was concluded that from relevant literatures reviewed that remediation package reduce more errors and influence performance better than lecture and other methods in physics and subjects.

Recommendations

(1) Physics teachers are recommended to use Remediation Package Remediation Approach because of its efficacy in reducing errors and increasing performance.
(2) It is recommended that Remediation Package should be designed for other subjects to achieve same purpose of reducing errors and increasing performance.

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